University of Alberta

The Construction of Topological Space

by

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Abstract

Topological spatial relations are presumably speaker-neutral and objective. This thesis takes issue with this assumption and argues that the construction of topological spatial relations is rather subjective, contextualized and perspectivized. In order to give evidence for this, this dissertation surveys the conceptualization of topological space and the lexicalization and distribution of the various meaning components that go into spatial description. As I look at the effects of and interaction among language, cognition, and perception in a variety of languages, I challenge the idea that there are semantic universals.

The language at the center of my dissertation is Dene Sųłine (Chipewyan), a polysynthetic Athapaskan language spoken in Cold Lake, Alberta (Canada). I compare this language with an agglutinative language, Upper Necaxa Totonac (Mexico), as well as various Indo-European languages (English, Norwegian, German).

To gain natural language data, I have drawn on two elicitation tools developed at the MPI in Nijmegen, the *Topological Relation Markers* and the *Caused Position* test. The first test consists of 71 simple black-and-white drawings of various objects, e.g., a cup on a table. Participants are asked to react to the prompt "Where is object X?". The second test consists of 46 videos in which the location of an object is manipulated with or without showing the agent. In addition to these tests, I have also developed the *Spatial Categorization Elicitation* tool that consists of 95 video clips showing static or dynamic relationships between objects.

The results of my dissertation support a distributional and only partially compositional view of semantics. Moreover, the various meaning components that go into the encoding of spatial description in many languages are hard to pinpoint to a single morpheme or word. Moreover, for speakers of some languages, especially Dene, seemingly static and objective scenes require morphosyntactic devices which signal perspective, level of specificity, motion, causation, and other 'non-spatial' meaning components.

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Abbreviations

[?]	Unidentifiable morpheme's meaning
AM	Classificatory verb stem: Object being an "amorphous mass with the texture of hay, grain, snow […]" (Davidson et al. 1963: 34)
ACC	Accusative
AO	Single animate object
APL	Applicative
BP	Body part (used in Totonac to specify a location with the human body as the reference point), e.g., head, arm, mouth etc.
CL	Classifier: determines the intransitivity or transitivity of the classificatory verb stems in Dene
CLV	Classificatory verb system: used in Dene to profile the FIGURE regarding its qualitative features such as size, shape, material, texture, animacy, e.g., round object, solid object, mushy matters etc.
DAT	Dative case
DEIC	Deictic
DET	Determiner
DST	Distal
DYN	Dynamic
EXIST	Existential marker, neutral orientation in terms of spatial encoding, e.g., 'to be'
FIG	FIGURE: smaller and movable entity in a construction
FO	Classificatory verb stem: flat or flexible objects exist/lie or are handled, e.g., 'blanket', 'article of clothing', 'a leaf', 'a pillow', 'a dollar bill' (S. Rice 1997: 106).
GEN	Genitive case
GND	GROUND: larger and more static entity and anchorage point
GND_1 GND_2	GROUND: depending on the (di-, tri-)transitivity, several reference points get encoded being GND_1 and GND_2 as in "the boy [FIG] hides from the girl [GND_1] behind the chair [GND_2]"
IMPF	Imperfective process: temporal process (atelic)
INST	Instrumental
LOC	Locative (post-, pre-, adposition): a spatial marker profiling the general location of the FIGURE and a linking element related to the FIGURE and GROUND
MM	Classificatory verb stem: a mass of mushy matters exists/lies, e.g., 'lard', 'butter' 'honey' (Davidson et al. 1963: 34).
MNR	Manner: FIGURE's qualitative characteristics of its specific orientation in space and/or time as in 'S/he strolls out of the room', the verb 'to stroll' profiles the FIGURE's motion
NM	Nominalizer: Nouns can be formed by an intransitive verbs using a suffix. These nouns express either a state or object created by the process denoted by the verb, or refer to an object, substance, or sensation which is definitive of or typified by that process (Beck 2004)
NOM	Nominative case
NREL	Non-human relativizer (Totonac only)
OC	Classificatory verb stem: open container exists/lies (+/–liquid)

PERF	Perfective process: temporal process that has come to an end (telic)
PO	Possessive: ownership of the FIGURE
POST	Posture or neuter verb: object being at rest/exists/lies; implies that these verbs are posture verbs, e.g., ‘sit’, ‘stand’, and ‘lie’ (S. Rice 2002b).
PL	Plural
PRF	Perfect
PRG	Progressive: temporal and ongoing process (atelic)
PST	Past participle
REFL	Reflexive
RO	Classificatory verb stem: round or hard/compact objects exist/lie, e.g., ‘ball’, ‘radio’, ‘coin’, ‘pen-knife’, ‘one berry’, ‘one shoe’, ‘ring’ etc. (Davidson et al. 1963: 34).
S	Subject: syntactic category (in most cases parallel to the FIGURE)
SG	Singular
SO	Classificatory verb stem meaning a single “rigid stick-like object”, e.g., ‘pen’, ‘scissor’, ‘table’, ‘chair’, ‘key’, ‘canoe’, ‘car’ (Davidson et al. 1963: 34)
STAT	Static
VCA	Classificatory verb stem: Verbs that express partially controlled action that is initiated by an agent
VFM	Classificatory verb stem: Verbs referring to free movement not involving an agent (verbs of free movement)
VMC	Classificatory verb stem: Verbs that express handling or manipulation and continuing manual contact

> For Marx and Engels, the concept of production never emerges from the ambiguity which makes it such a fertile idea. It has two senses, one very broad, the other restrictive and precise. In its broad sense, humans as social beings are said to produce their own life, their own consciousness, their own world. There is nothing in history or in society which does not have to be achieved or produced. 'Nature' itself, as apprehended in social life by the sense organs, has been modified and therefore in a sense produced. (Lefebvre 1991: 68)

Chapter One

1.1. Language and Space

This dissertation deals with the construction of meaning, and in particular with the construction of spatial meaning (Hayward & Tarr 1995; Regier & Carlson 2002). What is meant by the construction of meaning is best described by Wittgenstein's definition of language in use: "for a *large* class of cases—though not for all—in which we employ the word meaning it can be defined thus: the meaning of a word is its use in the language" (Wittgenstein 1953: 20, emphasis in original; see also Austin 1994; Brenner 1999). As to the phenomenology of space, the following quote describes a very common view of it:

> Raum umgibt uns, wir sind stets ein Teil davon. Insofern haben wir zunächst einmal gar kein sprachliches Problem vor uns. Vielmehr stellen sich die Fragen, wie wir Räume erfahren, wie sie für uns erfahrbar werden und wie wir mit ihnen umgehen. (Schweizer in Vater 1991: 1)

> Space surrounds us, we are always a part of it. In this sense, we are not primarily confronted with a linguistic problem. Rather, questions arise as to how we experience spaces, how we manage to experience them and how we deal with them (translation M.T.).

This quote refers to the general problem of how we experience and linguistically encode space. Topological spatial relations are defined as locational relations between objects that specify space in general.[1] Within the conceptual domain of spatial relations, lexical semanticists regard topological relations as more basic than this. Moreover, topological relations are considered impermeable or perspective-neutral locative relations between physical objects. Linguistic topology is regarded

---

[1] Topological relations are based on Euclidean geometry. It is a mathematical construction that fails as a description of reality. One of the major struggles in accounting for finite and abstract spaces is Euclid's parallel axiom. He claimed that a point X on a line A that is parallel to a line B can never meet a point Y on line B in a finite space. In the 18th century, Carl Friedrich Gauss, János Bolyai and Nikolai Iwanowitsch Lobatschewski, among others, developed an alternative geometry to Euclidean geometry (cf. Jammer 1954; Ray 1991; Nerlich 1994a, b; Sklar 1974; Reichenbach 1958).

> […] as the most general science of spatial relations, can be based on the relationship between "part" and "whole" or in other words on the concepts of "being-included-in". Closely related to these concepts is that of the "surrounding" of a "point". [...] Topologically there is no difference between a circle, an ellipse, a regular or irregular polygon with any number of sides. [...] [L]ikewise, there is no difference between a sphere, a cube, cylinder, and a cone. Differences in size are also disregarded in topology. (Lewin 1936: 87-88)

Moreover, the general question is at issue whether space defines obiects (space conceived as a container within which objects can be located), or whether objects define space (space is made up of relations between objects). Those two questions are generally regared as the *container view* versus the *configuraion view* (Lang, Carstensen & Simmons 1991: 7). I agree with Lang, Carstensen & Simmons (1991) claim that both views are applicable.[2]

The translation of topological concepts into language is generally assumed to be achieved by prepositions in English and in most other languages (Bennet 1975; Brée & Pratt-Hartmann 2002; Carlson 2000, 2003; Carlson & Logan 2001; Cienki 1989; Crangle & Suppes 1989). For example, to encode horizontal alignment, the prepositions 'on' and 'in' are ideally used (Hawkins 1986; Herskovits 1985, 1986; Landau & Jackendoff 1993; Svorou 1993). Additionally, there is the interior, e.g., 'in', 'inside' versus the outer space, e.g., 'at'. These relations are considered to be universally relevant to linguistic descriptions cross-linguistically and to be neutral regarding scale and orientation.

1.2. Objective Approach to Encoding Spatial Relations

If one only looked at a handful of European languages, it might seem that universal perceptual mechanisms are at work and, cross-linguistically, speakers encode spatial relations in a scene on relatively similar and objective grounds (Bryan, Tversky & Lanca 2000; Dirven, 1982a, b, 1993). When presented with black-and-white line drawings depicting the spatial relationships between two prominent objects, speakers' answers to the question "Where is object X?" were as follows:

---

[2] Knowledge of an object embodies knowledge of the object's spatial dimensions, that is, of the gradable characteristics of its typical, possible or actual, extension in space. Knowledge of space implies the availability of some system of axes which determine the designation of certain dimensions of, and distances between, objects in space. (Lang, Carstensen & Simmons 1991: 7)

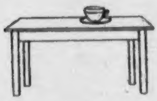

Figure 1: CUP ON TABLE
Prompt: *Where is the cup?*

(1) a. FIG EXIST/POST LOC GND[3] German
Die Tasse ist/steht auf dem Tisch.
The cup 3sg.S.IMPF.be/stand on the table
'The cup is/stands on the table.'

b. FIG EXIST LOC GND Norwegian
Kopp-en er på bord-et.
cup-the 3sg.S.IMPF.be on table-the
'The cup is on the table.'

c. FIG EXIST LOC GND French
La tasse est sur la table.
The cup 3sg.S.IMPF.be on the table
'The cup is on the table.'

d. FIG EXIST LOC GND Spanish
La tassa está en la mesa.
The cup 3sg.S.IMPF.be on the table
'The cup is on the table.'

The examples in (1) encode the cup (in all cases the FIGURE[4] or TRAJECTOR) as being located on the table (the GROUND or LANDMARK).[5] In addition, all these languages use a positional or existential verb that marks the location of the cup and places it in a static 'on'-relation with respect to the horizontal GROUND, i.e., the table. The verb does not specify any further information about the object to be located explicitly, that is, no additional semantic information in terms of the material or shape of the object is given.[6] In short, speakers of these languages generally encode the picture in Figure 1 as a static spatial relation between the cup and the table and express it by means of a copular or posture verb along with a preposition.

---

[3] The FIGURE is the smaller entity with respect to the larger background (GND) related either by an existential (EXIST) or a posture verb (POST) in addition to a locative marker (LOC).

[4] All technical terms will be highlighted with capitals in this dissertation.

[5] Language construes different concepts in invoking a reference point and a referent. Two main cognitive operations based on physiological properties can be established: the FIGURE as the variable element or positive space and the GROUND as the reference element or negative space (Hofstadter 1980; Talmy 1978, 1983, 2000a-d). For Langacker (1987), these are called TRAJECTOR and LANDMARK, respectively.

[6] Posture verbs imply certain orientations such as *steht* in (1a), i.e., only long objects with full contact to the ground can 'lie', while objects with some vertical extension can 'stand'.

Topological relations are generally assumed to be universal and are described as being encoded by locative markers or adpositions. Most of such adpositional analyses are Anglo-centric (Hawkins 1986; Lakoff 1987; Tyler & Evans 2003), unempirical, and demonstrate the biases of the scholars (cf. Sandra & S. Rice 1995 for critical comments). Most scholars rarely get beyond their own linguistic and aesthetic biases and tend to make claims about language and cognition that do not even hold for English. Furthermore, most analyses perpetuate the assumption that spatial meaning resides in a locative morpheme only.

> Existing approaches to the semantic analysis of locative particles (e.g. English spatial prepositions) presuppose a local semantics for these lexemes. That is, it is assumed that the semantic content which they bear is distributed paradigmatically over the single form-class. To put it more simply, it is assumed that spatial relational meaning [...] is carried by the locative particle, and only by the locative particle. This is, by definition, the basic assumption of all kinds of contrastive analysis [...]. (Sinha & Kuteva 1995: 167)

In general, it is assumed in the literature that the physical world is well-delineated and unambiguously conceptualizable. For example, in truth-conditional semantics, there is a case scenario of the world that is mirrored by well-formed language. According to such approaches going back to logic developed by Carnap, Frege or Russell, the physical world is made up of objects that are well-defined in shape and position in space (cf. Johnson 1987 for an extensive critique of this objectivist view). The logical approach to language describes it as functioning primarily to denote concepts that are speaker-neutral and dependent on the inherent features of the object (Armstrong, Gleitman & Gleitman 1983; Flores d'Arcais 1986; Heller 1990; Herrmann, Grabowski, Schweizer & Graf 1992; Herrmann & Schweizer 1998). According to this view, what people talk about are discrete objects and their relations to the world and the spatial domain is situated in a multidimensional coordinate system as proposed by most geometric Euclidean approaches (Brugmann 1988; Hawkins 1986; Herskovits 1986; Lakoff 1987b; Ruhl 1989; Svorou 1993; Tyler & Evans 2001, 2003). In linguistics in particular, it has been assumed that the meaning of locational topological expressions can be specified as a proposition construed out of a simple geometric relation applying to the objects.

As opposed to such objective theories, this dissertation offers an alternative guided by the idea that the language system is informed by cognition, and cognition is informed by everyday human experience (S. Rice 2002b: 64; see also S. Rice 1992, 1993).[7] I argue in line with Johnson-Laird that "the relation [of lexical semantics; M.T.] to the world depends on human cognitive capacity" (Johnson-Laird 1983: 204). Or as MacLaury argues,

> we know the world through [...] constructed perspectives. When we speak, we name and discuss these points of view rather than the world by itself detached from an observer. (MacLaury 1995: 231)

Hence, language is not a monadic and inner mental representation (Markowitsch 1992; McClelland 1988; Oeser & Seitelberger 1995; Pechmann & Engelkamp 1992, but a medium that interacts with the outer social and public space as a social practice (Thornton 1998; Vohra 1986; Wittgenstein 1953). My focus on what I call *subjectivized spatial marking* in language may seem odd since it it is generally assumed that spatial relations between physical objects only need to be detected by our senses and then verbalized. However, following Wittgenstein and others, I argue that perception is individually marked (Gosztonyi 1976: 825). Every human being has his/her own space of perception, i.e., space is individually and dynamically determined by experience (Grosztonyi 1976: 824).

> Es gibt keine „natürliche" Ordnung der Dinge, so dass die Raumstruktur ausschließlich durch den Menschen – durch seine Sinne und seine Denktätigkeit – zustande kommt. Ohne den Menschen gäbe es nur „Chaos". (Gosztonyi 1976: 1036)
>
> There is no "natural" order of things, therefore the structure of space depends only on the human being—created through his/her senses and thinking. Without the human being, there would only be "chaos". (translation M.T.)[8]

Perception depends on embodiment and is a dynamic process or interaction (Grosztonyi 1976: 827; see also Barsalou 1999). In taking this provocative stance as my point of departure, I will criticize those representational approaches that invoke physiological mechanisms wired in the human brain at the expense of the filtering effect of language (Eilan, McCarthy & Brewer 1993). All we as human beings can talk and think about is language-mediated and constructed, we can never step outside of language and our language "games", to use Wittgenstein, and perceive the world purely or directly (Wittgenstein 1953; cf. Foucault 1986). Our understanding of space and spatial cognition is, therefore, a product of our language, arrived at over innumerable acts of communication or discursive practices unfolding in time (Akhundov 1986; Trehub 1991).

---

[7] Hence, my research is in line with Levinson's claim that "[…] there are very substantial differences between languages in the semantic parameters utilized in spatial description, and that makes it natural to ask how these parameters correlate with non-linguistic cognition." (Levinson 2003; see also Gumperz & Levinson 1996)

[8] Gosztonyi divides space up into 29 different spaces (Gosztonyi 1976: 34-51). He presents a comprehensive and detailed summary of different conceptions of space from pre-Platonic philosophy to current models and theories in philosophy and theoretical physics. Considering this vast number of different spaces, it strikes me that we as cognitive linguists have used and still use the concept of space rather imprecisely and monolithically.

> The meaning potential is all the information that the word has been used to convey either by a single individual or, on the social level, by the language community. The meaning potential, then, does not result from trying to find a generally valid type meaning for a word; rather, it is the union of individually or collectively remembered uses. (Allwood 2003: 43)

1.3. Subjective Approach to Encoding Spatial Relations

This dissertation investigates the construction of topological spatial relations in a small set of typologically distinct languages with a specific focus on the Northern Athapaskan language Dene Sųłiné (formerly known as Chipewyan), or, to be more precise, the Cold Lake dialect of it, spoken in Western Canada.

The aim of my dissertation is to challenge the assumption of speaker-independent, if not perceptually based features in the encoding of spatial categorization. The use of such features is assumed by most lexical semanticists who study spatial terms (Lehrer 1990; Nuyts & Pederson 1998; Rosch & Lloyd 1978; Taylor 1989; 1990; Tsohatzidis 1990). Instead, data from various elicitation tools will be presented that support a subjective and perspectivized construction of space or at least shed some light on the construction process and the various, if not all topological, components involved in it. Hence, this dissertation is about the construction of what has been called topological spatial relations, and one of my aims is to question canonical models of spatial semantics that do not go beyond an objectivist view of reality.

In example (1e), in a response from an Upper Necaxa Totonac speaker to describe Figure 1 in Chapter 1.2. above, the FIGURE is profiled in a more specific and less generic way as opposed to the responses in (1a-d).[9]

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[9] Upper Necaxa Totonac belongs to the Totonac (Papantla, North-Central, South-Central, and Misantla Totonac) and Tepehua (Tlachichilco, Huehuetla Tepehua, Pisa Flores Tepehua) family of languages, an isolate linguistic group in the Northern Puebla State, Mexico, and adjacent areas of Veracruz and Hidalgo.

(1)e.	LOC$_1$+LOC$_2$:BP	GND	POST	FIG	Totonac
	naixa'kpú:n	*mésa*	*wi:lh*	*ta:sá*	
	nak=ix-a'kpú:-n	mésa	wi:lh	ta:sá	
	LOC=3PO-crown-NM	table	sit	cup	

‘The cup is on top of the table’

In addition to the usage of an all-purpose oblique locative marker *nak*, the FIGURE is located with respect to a metaphorical body part construction profiling the ‘up’-part of the FIGURE by means of the use of *a'k pú:n*—the ‘crown’ of the human head. The posture verb encodes the FIGURE-specific quality that enables it to ‘sit on top of the table’, hence, three semantic components profile the specific spatial location taking the human body as the perceptual reference point.

For speakers of Dene, no physical object (or FIGURE) can be specified without reference to its shape or configuration, i.e., the fact that it is round, stick-like, flexible, or animated has a function constituency (Davidson, Elford & Hoijer 1963; Li 1946; S. Rice 1997). Semantic information about the FIGURE is often conflated into the verb stem in Dene, in contrast to the generic encoding the FIGURE receives in the European languages given in the examples above. Example (1f) presents a typical elicited description of the scene in Figure 1 in Chapter 1.2. by Dene speakers.[10]

(1) f.	GND	LOC	FIG	DEIC+CLV=STAT[FIG]	Dene
	bek'eshich'elyį	*k'e*	*tsobįlí*	*da-the-tą*	
	table	on	cup	up-IMPF.3sg.S-SO.be situated	

‘The cup is (located) up (there) on the table.’[11]

The example in (1f) indicates that for a Dene speaker the scene is indeed encoded as a static ‘on’-relation between the FIGURE—‘the cup’—and the GROUND—‘the table’. However, (1f) also indicates that the verb stem in itself expresses more than the static location of an entity, i.e., functional information of the involved object is encoded as well. Hence, it also specifies that the FIGURE is a compact round object. Moreover, this

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It is spoken by around 3,000 people in four communities, Patla and Chicontla, in the Necaxa River Valley in Northeastern Puebla, and Cacahutl’an, San Pedro.

[10] I will use standard orthographies for the European languages and for Totonac. I use Dene Comic Sans for all Dene examples to indicate, among others, lateral affricate as in [tł], fricatives as [ł], glottal stops [?] and the different tone differences and nasalizations of vowels [á, ą,ą́,], [é, ę, ę́], [í, į, į́], [ó, ǫ, ǫ́, ú, ų, ų́].

[11] In its neuter and momentaneous forms, the stem verb encodes also ‘to handle a long stick-like object’. Note also that the aspectual prefixes (*-the-* in the present example) are placed immediately before the pronominal subjects (Li 1946: 412).

object is conceptualized in a deictic and, hence, pragmatic frame.[12] This is due to the inclusion of the verb prefix *da-* 'up' that here conveys the fact that, from the vantage point of the speaker, the placement of the cup is above a waist-level midline (S. Rice 2002b). Hence, the relation of the FIGURE to the GROUND is not neutral in terms of perspective as opposed to the neutral 'on' perspective in all the examples in (1a-d). Hence, there is an increase of semantic load in the encoding of degree of specificity and perspective used by speakers of the various languages from very general—the European examples—and non-specific to very specific encodings—Totonac and Dene.

The phenomenon I explore here is known as the degree of specificity of the FIGURE's location with respect to the GROUND (Svorou 1993). This degree of specificity is related to the amount of detailed expressive content with which spatial relations are described in various languages. Svorou claims that the English prepositional phrase 'on the door' has a lower degree of specificity compared to 'on the left side of the door' (Svorou 1993: 6-8). The latter specification encodes further partitions of the door into smaller regions. Dene and Totonac speakers are required through their language—or what I will refer to below as *language affordances* (the semantic content hard-wired into specific morphosyntactic devices) to depict a scene in a highly specified and often highly contextualized way that often includes deictic information. The viewer of a situation is part of the description being embedded in what I will call a *deictic vector matrix*. In short, there is no neutral or absolute construal, but either a construal that mentions or one that does not mention the vantage point of the speaker; hence, the speaker's perspective is expressed in some languages, and not in others.

I will now come to another example that gives a flavor of the different ways that spatial relations are constructed in Dene. Again, I use a supposedly simple stimulus picture from the Topological Relations Markers series (an elicitation tool contaning 71 simple black and white drawings of various FIGURE/GROUND relationships; see section 1.4.1 below) , one that is anything but simple for a Dene speaker. The picture in Figure 2 below illustrates the difference between stativity and dynamicity in the encoding of space in the different languages elicited in this dissertation. It shows a scene that at first seems to be topological and, hence, static. However, whereas speakers of Germanic and Romance languages tend to describe the scene illustrated in Figure 2 as static, Dene speakers (especially the strongest ones) tend to describe the scene as dynamic.

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[12] The idea of deixis is crucial in this dissertation. I agree with Levinson (2003) that deixis is not necessarily spatial. "Deixis concerns the relativization of reference to properties of the speech event. Many aspects […] have nothing to do with spatial conception. But deixis is involved in the interpretation of spatial expressions in many different ways. […] [M]any statements of location and motion make overt reference to deictic parameters, as in *It's over there* or *He's coming here*. […] [D]eixis is simply a means of providing a rather special ground or reference point, namely the location of the speech participants." (Levinson 2003: 70; see also Bühler 1934).I will use the term as an element that has no stable referent but receives its semantic content from the situation or context of an utterance (Bal 1996: 72; thanks to Susann Lewerenz referring to Mieke Bal's comment).

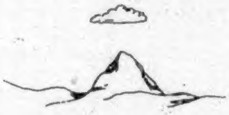

Figure 2: CLOUD ABOVE MOUNTAIN
Prompt: *Where is the cloud?*[13]

(2) a.		FIG	EXIST	LOC		GND	German
	Die	*Wolke*	*ist*	*über*	*dem*	*Berg.*	
	the	cloud	3sg.S.IMPF.be	above	the	mountain	

‘The cloud is above the mountain.’

b.	FIG	EXIST	LOC	GND	Norwegian
	Sky-en	*er*	*over*	*fjell-et.*	
	cloud-the	3sg.S.IMPF.be	above	mountain-the	

‘The cloud is above the mountain.’

c.		FIG	EXIST	LOC		GND	French
	Un	*nuage*	*est*	*au-dessus*	*d’une*	*montagne.*	
	a	cloud	3sg.S.IMPF.be	above	a	mountain	

‘A cloud is above the mountain.’

d.		FIG	EXIST	LOC			GND	Spanish
	La	*nube*	*está*	*arriba*	*de*	*la*	*montaña*	
	the	cloud	3sg.S.IMPF.be	above/over	of	the	mountain	

‘The cloud is above/over the mountain.’

e.	BP+LOC_1	FIG+LOC_2	FIG+BP	GND+LOC_3	Totonac
	lakatzunajtzá	*waka'lh*	*ixpu:hélhni'*	*naksipéj*	
	laka-tzunaj=tzá	waká'lh	ix-pu:-hélh-ni'	nak=sipéj	
	face-close=now	be.high	3PO-CTD-mouth-NM	LOC=hill	

‘The cloud is closely over the irregular upper surface of (mountain).’

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[13] The elicitation tool requires the researcher’s question “Where is object X?” to prime a very specific answer and not an unstructured description of the scene. Such a description would, of course, change the purpose of the test since such an approach would most probably trigger more non-static explanations of the scene.

f.	GND	LOC	FIG	DYN+CLV[FIG]	Dene
	tthe.shéth	*daghe*	*yak'odhaz*	*ghe-sheł*	
	rock.hill	above	cloud	IMPF.3sg.S-AM.move	

‘A cloud moves above a mountain.’

The examples in (2a-d) suggest that the FIGURE is construed as being located above the GROUND in a static, neutral, and relatively non-perspectivized relation. The scene is fairly idealized and seems to be independent of a particular viewing arrangement. In comparison to this, we see in example (2e) that the Totonac description of the scene is more specific. Here, the FIGURE is not only located over the GROUND, but in a certain proximity to a part of it. Still, this relation is encoded as static.[14]

In contrast to the descriptions in (2a-e), the Dene example in (2f) indicates that the description of the scene relies on the speaker's real-world knowledge of clouds, which are perpetually in motion. In this case, speakers of Dene include the information that a ‘cloud’ is never simply ‘over’ the mountain, but that it moves as well. In Dene, the scene is encoded as a dynamic motion event that necessitates a physical description of the FIGURE through the selection of a particular classificatory verb stem and not as a static spatial relation between the generic objects only. Hence, the Dene language user contextualizes the scene as opposed to European speakers. Additionally, a mapping process occurs in which the cognitive domain of time collapses with the one of space. Hence, in this example there is no use of a purely topological and static ‘over’ or ‘above’ relation referring only to an objective and geometric coordinate system (Eschenbach 1999). In Dene, even such supposedly simple scenes require additional semantic information in their description.

One of the central questions of this dissertation is the source of such encoding differences. In my dissertation, I will take cognitive linguistic premises at face value, i.e., approaches that are usage-based, language-specific, and adhere to a view of embodied meaning. In doing so, I have conducted an empirically-based study of spatial meaning across a variety of languages, the main focus of which is the polysynthetic language Dene. In such a language and for speakers of such a language, topological relations are not necessarily the most salient aspects of a given scene, even if speakers are explicitly asked to comment on the specific locative relations therein. Moreover, dynamic and deictic elements are included that are neither spatial nor absolute (Crawford, Regier & Huttenlocher 2000; Regier 1996; Regier & Carlson 2002; Thiering 2006).

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[14] David Beck has pointed out that Totonac speakers often express the location of a movable object with special compound verb forms.

1.4. Towards an Empirical Approach to Analyzing Spatial Categorization

To explore some of the various and rather complex mechanisms involved in the description of spatial scenes and the subsequent encoding of topological spatial relations, I have used a battery of elicitation tools ranging from simple black-and-white line drawings to video clips (for detailed descriptions see Chapters 3-5 below). Two of the tests were developed by the Language and Cognition Group of the Max Planck Institute for Psycholinguistics in Nijmegen, Netherlands, and one by the author. These elicitation tools were used to demonstrate how the subjective construction of space transpires via differences across languages and to pinpoint which imaging parameters are involved.

1.4.1. Topological Relational Markers Picture Series

The first elicitation tool—the *Topological Relational Markers Picture Series* (henceforth *TRM*) by Pederson, Wilkins & Bowerman (1998)—consists of a set of 71 simple line drawings as exemplified in the various figures above. The general idea of the *TRM* is to identify how various languages encode the system of spatial relations, and to determine what the semantics of these spatial systems are.

For elicitation purposes, Pederson et al. (1998) ask for a minimum of 3 speakers. In terms of a valid cross-linguistic comparison, Pederson et al. (1998) propose a number of 10 speakers. In my pilot study, 14 speakers of Dene were interviewed.[15] For purposes of cross-linguistic comparison, I also ran this task with speakers of Indo-European languages, i.e., English, German, and Norwegian (see Chapter 3).[16]

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[15] There is a critical language attrition process going on in the Cold Lake Dene community: In many cases, younger speakers cannot produce grammatical correct paradigms any more. Further, there is also a strong influence of the English language on younger Dene speakers, hence, they produce more English-type sentences than Dene-type ones. The Cold Lake community consists of about 2,000 people who call themselves Dene; however, only about 200 of them still speak the language on a daily basis.

Speakers were asked individually to relate the displayed objects in answering the question "Where is object X"? The general idea of the *TRM* set is to enable the comparison of the grammatical marking of topological relations in a wide array of languages. It enables one to explore how different languages use their linguistic resources to carve up the domain of topological spatial relations. The line drawings are intended to evoke discussion on how the depicted relationships between objects are linguistically represented. As suggested by Pederson, Wilkins, and Bowerman (1998), spatial descriptions are often a good place to locate grammatical distinctions that are not strictly spatial in nature.[17]

This test was developed as a controlled means to elicit language data without resorting to translation equivalents, thus enabling a field linguist to begin exploring a language's resources for describing topological spatial relations. Of course, the larger purpose was to try to capture, if not exhaust, the various markers and the sense extensions associated with them to encode topological relations cross-linguistically for detailed typological comparison.

1.4.2. Caused Position Test

The second test—the *Caused Position* test (henceforth *CP*); developed by Hellwig & Lüpke (2001)—is a follow-up study to the *TRM* test. It is also designed to elicit static locative descriptions. It primarily aims to exhaust the verbal elements used to express location as in 'sit', 'stand', and 'lie'. The focus here is on the role of an external agent and dynamism in the different usages of positional verbs in locative constructions (Hellwig & Lüpke 2001: 126). It was developed to reveal the inception of positions between FIGURE and GROUNDs in 46 short video clips. The consultant is asked to describe the displayed scene, e.g., someone putting an object such as a ball, rope, or bottle of wine on a table, the ground, or a tree.

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[16] In addition, whenever possible, I have infrequently asked speakers of various other languages to respond to the stimuli such as French, Spanish, Danish, and Swedish.

[17] This is indeed the case in Dene and, as it turns out, the 'Where'-question proposed by Pederson et al. (1998) implies or even forces a topological spatial relation which does not necessarily make for a natural description of a scene for a Dene speaker, hence a task effect or response biases tended to occur frequently (see Chapter 3).

These video clips are contrasted with static clips in which the object simply appears without a causer, i.e., the object is shown independent of an event. After each initial description, the researcher may prod the speakers for other possibilities.

1.4.3. Spatial Categorization Elicitation Test

The third elicitation test—the *Spatial Categorization Elicitation Test* (henceforth *SPACE*) developed by the author (Thiering 2005)—is based on about 95 short video clips (approximately 10 seconds per clip) presented in a random order. As a set, they exploit and exhaust only the imaging parameters outlined in Table 4 (see below; Chapter 2.2.) for a given scene and include the various manipulations of a wide range of 'natural' objects in different situations including varying surfaces, e.g., water, table, ground. To elicit different constructions, I have developed various situations including different animate and inanimate objects in relation to a static reference point—e.g., stone(s) on the ground or in a vessel, stick(s) on the ground, bottle(s) on a table/the ground or moving surface (birds on water, leaves on water, boat on water). In addition, the task consists of singular, dual, or plural human figure shown in different positions—e.g., sitting on a stone or on the ground, leaning against a tree, or walking down a lane viewed from different distances to the camera.

Three different viewing distances were used to extract the semantics of different deictic perspectives: (a) proximal, (b) medial, and (c) distal. Furthermore, different numbers of objects were manipulated—e.g., by putting one or more objects on or into a vessel or placing it somewhere above or below (stone(s) on table, bottle(s) standing/laying on table or ground, keys on table, cloth folded/spread out on table/ground). Different orientations were imposed to reveal insights into the frames of reference used by Dene speakers. In all the video clips developed so far, Dene speakers from Cold Lake participated as actors. They were filmed while carrying out daily activities like putting on a jacket, chopping wood, and inserting/removing a screw in/from a piece of wood. In contrast to the Hellwig and Lüpke test (*CP*), I used common objects in a natural or real-life environment that could be realistically manipulated or interacted with by people.

1.5. Dissertation Overview

The remainder of this dissertation is organized as follows. In Chapter 2, I will present a typological overview of the survey languages. Following that, I will present the theoretical basis of this dissertation introducing various technical terms. Hence, I will define the crucial features used in the instantiation of spatial relations relying on the general FIGURE/GROUND asymmetry, as introduced by Talmy (1978, 1983), and Levinson's (2003) frames of reference. I will also outline the relation between cognition and language and introduce a number of imaging features that speakers instantiate in the construction of topological spatial relations. In Chapter 3, 4, and 5, I present selective results of the three elicitation tools. Each chapter will introduce the elicitation tool, methodology, subjects, and the results given in overall frequency counts. I will then provide selected examples from the different tools and give a detailed description of the various morpho-syntactic features and imaging parameters. The data sections are accompanied by abstract schemas that present the involved participants of the actual scene. Chapter 6 presents a summary and concluding comments. In addition, it introduces a model that is the result of the various data points in this thesis.

Chapter Two

Theoretical Preliminaries

2.1. Language Typology

This section presents a typological overview of the various languages under survey in this dissertation. I refer the reader to the standard literature and grammars on European languages under survey, i.e., the endless number of reference grammars of German (Duden 2005; Eisenberg 1999; Helbig 1999) and English, and the only comprehensive one of Norwegian (Faarlund, Lie & Vannebo 1999).

I will now present the less familiar Upper Necaxa Totonac language and give a brief sketch of its grammar. An insightful—and only—grammar of Upper Necaxa Totonac (Patla-Chicontla Totonac) has been published in 2004 (Beck 2004; see also Levy 1992 and Upper Necaxa Totonaco project at http://www.arts.ualberta.ca/~totonaco/index.html). I refer to this grammar specifically since it is the only available comprehensive description of this language—spoken in East Central Mexico by about 3,000 speakers—which I have used only in the first elicitation protocol.

Like Dene (see the next section), though not polysynthetic, Upper Necaxa Totonac is a morphologically complex agglutinative language that features particularly rich inflectional marking of the verb. Verb stems are inflected for subject and object agreement. There are four aspects (imperfective, perfective, perfect, and progressive), and three tenses: present (not marked), past (prefix *iʃ*-) and future (marked by the prefix *na*-). Verbs in Upper Necaxa Totonac are divided into two major aspectual inflection classes, active and stative verbs. Stative verbs have only imperfective and inchoative forms, whereas active verbs inflect four aspectual categories: imperfective, perfective, perfect, and progressive.

Totonac also has a wide range of valency-altering affixes that includes two causatives and four applicatives. In addition, the language is notable for its lack of prepositions and its extensive use of body part prefixes on verbs to form locative expressions and to localize the affected parts of event-participants, in many cases increasing the basic valency of the stem. Body parts are of special interest in this dissertation since they encode spatial relations in addition to posture verbs and adpositions. The prefixation of body parts resembles noun incorporation, but only special prefixing combining forms of body part roots may be incorporated. When these roots are incorporated, they serve to delimit the verb's locus of affect, that is, they indicate which part of the subject or object is affected by the action.

The next section provides a more detailed description of the Dene verb structure. As I will show, this language shows morphosyntactic structures that differ from the other languages in this survey. These differences give rise to the assumption made above that different languages have different affordances which need to appear in an expression for it to be be grammatical. More precisely, it seems that Dene needs to be more precise morphosyntactically than, English German, or even Totonac. This seems especially prevalent in the encoding of spatial topological relations, relations that are supposedly very basic in the area of space.

2.1.1. Dene Verb Structure

The general encoding pattern in Dene indicates that the language features a predominant and consistent classificatory verb system including directional prefixes as well as a postpositional inventory creating a relational predication cohort (Cook 2004; Kari 1979; Li 1946; McDonough 2000; K. Rice 1989; S. Rice 2002b on the general structure of the Athapaskan verb stem system).[18] Such verbs have different morphological forms depending on the object to be encoded. Hence, their stems change in terms of shape, animacy, and/or physical features of the object being located or handled (S. Rice 2002b: 69).

The general focus here is on the motivation of certain semantic construction types and the encoding of the FIGURE/GROUND asymmetry as modified by the cohort.

> The choice of a particular verb stem from the appropriate set of verb stems has the effect of assigning to the noun of the sentence certain qualities of number, shape, texture, or purpose. If these qualities are semantically inappropriate to the noun, another verb stem must be used (Carter 1976: 24).

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[18] Cook argues that Dene has about 36 postpositions that morphologically behave like nouns. They inflect with pronominal prefixes (Cook 2004: 92). Cook also highlights the fact that the determination of a postposition's meaning is as notoriously difficult as in English or any other language, hence, it is often impossible to determine the precise meaning out of context. However, these postpositional prefixes are widely acknowledged as modifying the meaning of the verb stem (cf. S.Rice & Wood 1996).

These stems profile existential situations or actions of certain categories of objects (Davidson et al. 1963). Table 1 summarizes the four classificatory verb types.

Table 1: The Different Classificatory Verb Types

1. Posture or locative verbs	no movement involved: e.g., 'sit', 'stand', 'lie', 'be in position/location'
2. Verbs of handling, manipulation, continuing manual contact	e.g., 'give', 'hand', 'take', 'put', 'handle', 'bring', 'carry'
3. Verbs of partially controlled action (+ agent)	e.g., 'toss', 'throw', 'hang up', 'set down', 'drop', 'lose', 'push over'
4. Verbs of free movement, independent of agent	e.g., 'fall/tip over'

(S. Rice 1997: 103; see also Cook 2004; Davidson et al. 1963; S. Rice 2002b)

The Dene verb shows polysynthetic and fusional characteristics in its morphology and has a rich prefix system. Subject and object prefixes are fused within the verb (Cook 2004; S. Rice 2002b: 66ff.). According to traditional accounts, the Dene verb consists of a verb theme (the basic lexical entry made up of a stem and one or more thematic prefixes) and additional prefixes (Li 1946; K. Rice 1989). A general idealized and simplified schema of the Dene verb plus stem pattern is given in Table 2.

Table 2: An Idealized Template Rendering of the Dene Verb Prefixes + Stem

PP	ADV	ITER	INCORP	PRON 3SUBJ	OBJECT	MODE	ASPECT	$1_{ST}/2_{ND}$S	CLASS	STEM
1	2	3	4	5	6	7	8	9	10	

(McDonough 2000)[19]

McDonough divides the verbal complex into a bipartite structure: Positions 1-4 are the satellites, and positions 5-10 are defined as the pre-stem position (McDonough 2000). The following list in Table 3 summarizes the single positions in more detail.

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[19] In the Athapaskan literature it is common to use such templates. The number of prefixes vary significantly, e.g., Athna has 23 prefix positions (Kari 1979), Slave 14 (K.Rice 1989), and Navajo 10 (Young & Morgan 1987).

Table 3: Prefix Slots

1. incorporated postposition
2. local and adverbial prefixes
3. iterative prefix (distributive)
4. incorporated noun stems
5. 3rd person pronominal subjects
6. pronominal objects
7. modal prefixes
8. aspectual prefixes
9. 1st/2nd person pronominal subjects
10. (valency) classifiers
11. stem

The positions (1-4) (= disjunctive prefixes) and (5-6) (= pronominal subjects/objects) are part of the disjunct or lexical zone and largely have a derivational function, positions (7-10) are called conjunct or grammatical zone and include obligatory inflectional categories such as tense, aspect, modality, subject agreement, or valency (Li 1946: 409). What are called valency classifiers in position 10 indicate the transitivity and voice of the verb, i.e., whether the subject takes a direct object or not. These classifiers mark the valency of the verb. With regard to the following analysis, the stem plus the positions 8-10 as well as 1 are of primary importance.

I argue that Dene provides the semantic information not aligned with lexical units or parts of speech in a decomposable morphosyntactic order, but in a more scattered fashion in which semantic cohorts are distributed throughout the phrase (for a similar description see Croft 2001).[20] This assumption is in line with Li's very insightful description of Dene. Li claims that it is not possible to parse verbs into discrete morphemes to determine the meaning. For example, the verb 'to dream' is composed of the prefix *ná-* and the stem *–te*. The former means something like 'here and there, about' and the latter 'a living being lies around'. Li argues that parsing *náste* 'I dream' into its components does not result in the English understanding of dreaming from the morpheme's meanings, i.e., combinations of morphemes are lexicalized.

It has thus, to be concluded that the templates presented in Tables 2 and 3 are only an idealized version of the verb structure. The conception of cohorts that I will define in the next chapter and that will be used in this dissertation does much more justice to the semantic complexity of Dene than such a fine-grained and abstract description of the language.

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[20] The alternative concept of a *cohort* goes beyond an isolated lexical item, i.e., it is a concept that involves various pieces of information across an utterance that directly contribute to the encoding process and the predication of a set of relationships.

2.2. Imaging Features

Languages differ in terms of the actual lexical components that instantiate FIGURE/GROUND asymmetries. In other words, language-specific affordances profile the asymmetry between the FIGURE and the GROUND and determine the reference or viewing frame of the conceptualizer of a scene. The elements of a spatial relation are variably mapped onto the morphosyntax of different languages (Cuyckens 1994; 1997; Cuyckens & Radden 2002). They are not simply atomic spatial components; rather, they occur together with other elements to form a spatial construction or, to introduce the term I will use in this dissertation, *(spatial) cohort systems* (see below). Rarely does all spatial meaning reside in a single locative element such as a preposition (Clark 1968; Cresswell 1978; Dirven 1982a, 1993).

The fine granularity in Dene and Totonac, i.e., the degree of specificity in the description of spatial scenes, indicates the language-specificity of the encoding processes and the spatial orientation of the speakers. This relies on what I will call a qualitative vs. quantitative distinction, a measure indicating that the actual information is associated with a morphosyntactic cohort (made up of various morphemes which may be distributed across the entire utterance). The qualitative measure covers the semantic content of the utterance. The quantitative measure involves the number of morphosyntactic devices deployed in the expression such as the number of participants mentioned, the level of specificity at which they are mentioned, the type of verb used, the presence or absence of an overt locative marker, additional perspectivizing or background information conveyed by the speaker and so on. I will call this range of morphosyntactic and lexical devices in the encoding process *cohort systems*. These systems entail various participants including verb stems and a number of prefixes that are aligned to the verbs, but also to the FIGURE and GROUND. The cohort systems also include imaging features speakers profile in the instantiation of a spatial scene. The features given in Table 4 are used throughout the present study to label the relevant elements in an expression that has been elicited from speakers of different languages when asked to describe displayed objects in a spatial scene.

Table 4: Imaging Features Potentially used in Spatial Constructions

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1. FIGURE: Various Shape, Size, Material Construction
2. FIGURE/GROUND Alignment
3. FIGURE/GROUND$_1$, GROUND$_2$ Alignment
4. Perspective/Conceptualizer
5. SCOPE/SCALE/PROXIMITY
6. Functionality[21]
7. Deictic/Vector Spatial Information

(based on Langacker 1987, 2000; Talmy 2000b, c)

The major components that are used in addition to the FIGURE/GROUND alignment are:

1. Various verb systems such as existence, posture, dynamic, static and classificatory verbs
2. Various locatives profiling the degree of specificity of the FIGURE/GROUND asymmetry, Loc$_1$ + Loc$_2$, and body parts
3. Various FIGURES and GROUNDS profiling the scope of the scene and determining the involved participants.[22]

The foremost spatial information is given by the FIGURE/GROUND distinction. In addition to the FIGURE/GROUND asymmetry, speakers may encode information about perspective and even a temporal dimension.

All those features and the different encoding systems such as posture and classificatory verbs depend on the general idea that a spatial scene is based on the viewer and her/his perspective. This is analogous to the idea of a stage where the different participants are aligned by the viewer via her/his perspective. The perspective depends on various features. For example, the SCOPE of the scene is important. Langacker describes the SCOPE of an expression as "the array of conceptual content it invokes [...]. It thus comprises a set of cognitive domains [...]" (Langacker 2000: 5). By logical extension, proximity depends on the SCOPE of the construction. The FIGURE can be in a moving or in a static relation to the ground. It is important to carefully single out these imaging features since they provide information about how spatial language is used and what is actually expressed in an utterance (Hayward & Tarr 1995; Munnich, Landau & Dosher 2001; Regier & Carlson 2002; van der Zee & Slack 2003). In addition, the speaker needs to set the actual spatial and temporal matrix. That implies the kind of features that are profiled by different languages in different situations. These features determine whether the profiling is optional or obligatory in the particular language. These additional features help to instantiate the actual reference coordinate system that itself is subject to continual changes.

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[21] This parameter refers to Vandeloise's functional concepts (Vandeloise 1984, 1991). It is used here to motivate dynamic versus static situations.

[22] Langacker distinguishes five general parameters as cognitive abilities: specificity, background, perspective, scope, and prominence (Langacker 2000: 5).

My claim is that spatial information is also distributed across the proposition in lightly inflecting and relatively isolating languages such as English. The scattered distribution of relevant meaning components includes items ranging from adpositions and verbs to different kinds of lexical and tense/aspect markers. The different kinds of verbs range from existence predicates to posture verbs and specifically classificatory verbs (Senft 1997).

2.3. Cognition and Language

A long-standing tradition in philosophy—the one I am opposing here—argues that language must be grounded in reality (Davis 2003; Hershenson 1999; Marr 1982). This idea of language as a mirror of reality is called linguistic realism or naive realism (Lehar 2003). Wittgenstein rejected this view, as have others (Wittgenstein 1953; see also Derrida 1973, 1978, 1983; Dilman 2002; Monk 1994; Mulhall 1990; Rundle 1990; Sluga & Stern 1996; Tyler & Evans 2003; Vohra 1986;). He claimed that, in acquiring language, humans also acquire the objects of the projected external world (see also Piaget 1976, 1992; Piaget & Inhelder 1956; Heidegger 1985; Schmidt 1994, 1996, 1998; Watzlawick 1981).

Following this, I assume—as most cognitive linguists do—that language is not anchored in an objective reality that is in direct contact with cognition through sense perception. Indeed, it is only our language and cognitive apparatus that determines the kind of contact and interpretation we have with/of reality (Derrida 1973, 1978, 1983; Svorou 1993: 32; Wittgenstein 1953). Hence, there is always a mediator—cognition or more specifically mental spaces (Fauconnier 1994, 1997)— through which we perceive the outside world, even when the objects and their spatial location seem stable and 'real' (Fauconnier 1997: 34; Heisenberg 1934).

Most classical approaches to modeling cognitive processes as human information mechanisms are based on the Turing machine analogy (Penrose 1991: 28-71; Strube 1996). When such a serial computer metaphor is invoked, the brain is regarded as an input/output device having both long-term and working-memory capacity (Anderson 1983, 1996; Arbib, Caplan & Marshall 1982; Baddeley 1990. This approach is based on the idea of an information transmission device (Anderson 1983, 1996; Baddeley 1990; Gathercole & Baddeley 1993; Penrose 1991; Shannon & Weaver 1949). This implies that representational units are stored in the brain isomorphic to events in the real world (Aitchison 1997; Emmorey & Fromkin 1988; Rumelhart & McClelland 1986; Schreuder & Flores d'Arcais 1989; Tergan 1989; Spektrum der Wissenschaft 1994). Within such a model, language serves only as a code, transmitting information between cognition and the outside world (Penrose 1991).

The dominant philosophical tradition in the cognitive sciences has long claimed that all languages share the same underlying universal grammar and, therefore, by logical extension, the same conceptual structure (Chomsky 1965; Fodor 1983, 1998; Hillert 1985; Fodor & Katz 1964; Wierzbicka 1972, 1992, 1996). According to this view, the conceptual structure is based on perception, and visual perception of space in particular is regarded as an externally cued input system that transmits information via our senses. Cognition is considered to be the interface between the world out there and the internal mental representations we have of it (Anderson 1983; Damasio & Damasio 1994; Dunbar 1991; Dutke 1994; Engelkamp 1991, 1994, 1995; Fauconnier & Turner 2002; Gillett 1992; Hershenson 1999; Jackendoff 1983, 1987, 1993a, b, 2002). These representations are supposed to have developed out of physiological factors and to be genetically determined structures of the brain (Schnelle 1994; Spektrum der Wissenschaft 1994; Sucharowksi 1996; Strohner 1995; Spitzer 1996; Tergan 1989).

In other words, the brain as the organ in which all human activity is located has been the focus, whereas the issue of embodiment—the idea that the human body serves as the anchor for all experiences—has remained unexplored (Dunbar 1991; Ender 1994; Engelkamp & Pechmann 1988). Therefore, in conclusion, perception is not assumed to be affected by language or culture, or the individual affordances that depend on one's experience with mediated reality (Allwood & Gärdenfors 1998; Neisser 1987).

I argue in line with Slobin that perception and language are related and that the way human beings "perceive the world is affected by the way they talk about it" (Miller & Johnson-Laird 1976: 2).

> [W]e can only talk and understand one another in terms of a particular language. The language of languages we learn in childhood is a subjective orientation to the world of human experience, and this orientation affects the ways in which we think while we are speaking. (Slobin 1996: 91)

Furthermore, I claim that not only the brain, but the whole human body serves as an anchor for human experience. Hence, the interaction between language and perception is a basic process of mediation achieved by and based on the human body.

2.4. Cognitive Linguistics

In the following, I will outline some of the main features of cognitive linguistics as introduced by Lakoff (1987b), Langacker (1987, 1988, 1990, 1991, 2000) and Talmy (1978, 1983, 2000). In doing this, I want to sketch the general differences between cognitive linguistics (Allwood & Gärdenfors 1998) and traditional linguistics.

Langacker refers to the de Saussurian tradition of the arbitrary sign and the different binary systems like *langue* versus *parole* (de Saussure 1960). The membership of many grammatical categories is essentially arbitrary from a semantic point of view, thus arguing against traditional truth-conditional semantics based on propositional value (Kreitzer 1997).

One of the major hypotheses in cognitive psychology is the idea of mental representations as abstract schemas (Penrose 1991; Ritter, Martinetz & Schulten 1991; Schade 1992; Schreuder & d'Arcais 1989; Strube 1996). Such schemas are supposedly universal and not language-specific. Moreover, they are abstract representations of human thoughts or events, i.e., they are non-linguistic. They are extracted from more specific structures and categorize such structures through relations of full or partial schematicity. Language is regarded as a cognitive phenomenon represented in the mental lexicon, i.e., a storage metaphor that implies abstract structures is used here (Aitchison 1997; Ender 1994; Engelkamp 1991, 1994, 1995; Handke 1995; Schwarz 1992a, b, 1994a, b, 1995a, b).

The idea of abstract representations leads more specifically to the general claim in cognitive linguistics that all grammatical structures are symbolic. Additionally, the lexicon, morphology, and syntax form a continuum of symbolic units, each residing in the association of a semantic and a phonological structure or pole.

Moreover, the meanings of linguistic expressions are conceptualizations shaped in accordance with the linguistic system. In addition, all facets of our general knowledge of a conceived entity contribute to the meaning of an expression which designates this entity, and by that, any sharp distinction between semantics and pragmatics is gratuitous (Nunberg 1978; Sweetser 1990). Semantics is therefore not an autonomous cognitive entity, nor is the linguistic system overall.

Semantic structures are predications that are characterized relative to cognitive domains such as time, space, and color. Most domains of linguistic relevance are non-primitive. That means they are interrelated networks (Wender 1980; Zell 1994). As such, they involve cognitive structures of indefinite complexity, i.e., we have layers of interrelated networks that can be modeled in a connectionist fashion (Bechtel & Abrahamsen 1991; Birbaumer & Schmidt 1993; Edelman 2002; Hillert 1985, 1992; Kandel & Hawkins 1994; Murre & Goebel 1996). Any cognitive structure can function as the domain for a predication (Langacker 1987b: 56). Moreover, meaning is conceived as cognitive processing, and even expressions used to describe a presumably objective situation may differ in meaning, depending on how the situation is construed. An expression imposes a particular image on its domain. Imagery is used as a technical term for the cognitive capacity to construe a cognitive domain in alternate ways.

2.5. The FIGURE/GROUND Asymmetry

We have seen that one of the main claims about spatial relations in cognitive linguistics is that they depend on the instantiation of various perceptual parameters. The most prominent distinction is the FIGURE/GROUND asymmetry profiled in a given space-time continuum (Svorou 1993; Talmy 1978, 1983, 2000; Tyler & Evans 2003; Vandeloise 1991: 29).

According to Talmy's adaptation of the *gestalt* psychologist approach, certain cognitive categories play an important role in attributing the primary and secondary objects of a scene (Talmy 1983: 230). These functions are encoded by the FIGURE and GROUND of a scene—the variable element or positive space versus the reference element or negative space (Hofstadter 1980; Talmy 1978, 1983, 2000). The former is usually the smaller and moveable object whereas the latter is usually the permanently located, larger object (see Talmy's 20 parameters for the domain of spatial configurations of FIGURE/GROUND asymmetries (Talmy 1983: 277-78)).[23]

Three basic factors determine the contrast between FIGURE and GROUND: the size, movement, and position of the FIGURE in relation to the GROUND in the shared knowledge of the discourse participants. Talmy states that, e.g., adpositional phrases profile relationships such as the location of the FIGURE in relation to the GROUND, the time of the unfolding event, the manner in which the event unfolds, and the transition, motion and path of the FIGURE (Talmy 2000). For purposes of the current study, it is primarily the semantic features of location and motion of the FIGURE that are singled out. Besides, the semantic event features in addition to various other imaging parameters will also be described (Fillmore 1968; Frawley 1992; Talmy 2000; S. Rice 2002a). It should be noted here that this dissertation will not describe in detail the various lexicalization processes that are encoded by the various construction processes in the encoding of topological space.

The extra-linguistic context is not restricted to the physical aspects of the scene described by the speaker, but includes social aspects as well—e.g., the perspective from which the scene is perceived by the speaker in relation to the addressee (Vandeloise 1991: 44, see also Breslau 1982; Langacker 1987). The focal point of the speaker and the speaker's deixis have consequences on the description of the various scenes used in the present research (Kessler 2000). This has implications on the salience of the FIGURE/GROUND asymmetry as will be shown in the following chapters.

A single physical reality may be conceptualized in very different ways. Each way of conceiving a scene may correspond to a different linguistic description as shown in the sentences below:

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[23] The FIGURE is a moving or conceptually moveable object whose site, path, or orientation is conceived as a variable the particular value of which is the salient issue. The GROUND is a reference object (itself having a stationary setting within a reference frame) with respect to which the FIGURE's site, path, or orientation receives characterization (Talmy 1983: 232; see also Talmy 1978: 627; Capitals M.T.).

(3) a. *The statue is on the pedestal.*
b. *The pedestal is under the statue.*

These two sentences propose different FIGURE/GROUND-asymmetries constructed from the same physical scene (Vandeloise 1991: 44). They indicate a functional difference as encoded by the FIGURE and GROUND of a scene, and this asymmetry is mandatory in the encoding of spatial relations.

In languages like German, the FIGURE/GROUND-asymmetry can be changed simply by giving a different case marker as in the following example.

(4) a. *Der Hund läuft in den Park.* German
the dog 3sg.S.IMPF.run in the.ACC park
'The dog runs into the park.'

b. *Der Hund läuft in dem Park.*
the dog 3sg.S.IMPF.run in the.DAT park
'The dog runs around in the park.'

Hence, the conceptualization of the FIGURE/GROUND asymmetry depends on the signifier of every word. In association with a complex category, it is represented by lists of characteristic usages and similarities relating these uses to different levels of abstraction (Vandeloise 1991: 53). Adopting Wittgenstein's idea of *family resemblances*, Vandeloise uses the term 'global concepts'. Different languages make different judgments about these boundaries, since boundaries are inherently fuzzy or vague (Barsalou 1989, 1992; Blutner 1995; Breslau 1987; Labov 1973), and judgments might even differ from individual to individual.

The speaker's focal point influences the salience in the profiled context and, hence, a reversed FIGURE/GROUND relation can sometimes be obtained. Usually, the GROUND is taken as the salient point of reference, i.e., the larger background, and the FIGURE is related to it, not the opposite. However, this is not necessarily valid as a universal concept. Throughout my tests, some partially reversed FIGURE/GROUND asymmetries have come up that indicate a speaker-dependent and contextualized reference point.

2.6. Frames of Reference

Human beings instantiate relations between objects relying on various frames of reference that, as the name implies, serve as reference point. This reference point anchors a specific orientation between objects and the viewer (Carlson 1999; Carlson 2003; Carlson & Logan 2001; Carlson-Radvansky & Irwin 1993; Carlson-Radvansky & Carlson-Radvansky 1996; Levinson 2003). These coordinates are important for the description of topological spatial relations in Dene, as they are for the description of projective relations in general.

The encoding of spatial relations depends on the instantiation of certain spatial (and temporal) parameters that set the coordinate matrix for the speaker-hearer system. In general, spatial marking is based on the instantiation of three different reference frames to be selected from. These are assigned to the objects profiled in the situation (Carlson 1999, 2000, 2003; Carlson & Logan 2001, Carlson-Radvansky & Irwin 1993; Coventry & Garrod 2004; Levinson 2003).

The three frames of reference can be divided into (a) a viewer-centered or relative frame as in the English example *he's to the left of the house* (assuming that from the perspective of the viewer, a person is situated on the left side of the house), (b) an object-centered or intrinsic frame as in *he's in front of the house* (assuming that the front is where the main door is located), and (c) an environment-centered or absolute frame as in *he's north of the house.* In (a), the view point depends on the location of the perceiver's vantage point and his/her relation to the FIGURE and GROUND. The intrinsic frame in (b) is an object-centered coordinate system determined by culture-specific inherent features of the object. Finally, the absolute frame (c) is a fixed direction provided by, e.g., gravity or cardinal direction.

Most cognitive linguistic analyses use these parameters only in an idealized and purely visual way, but as Vandeloise cautions, any study of spatial language has to be mindful of the fact that we rarely deal with the visual perception of a static scene:

> [S]patial terms have been described in relation to our knowledge of the world. We have here a kinetic and dynamic understanding, not simply a static knowledge. For reasons of descriptive ease, a static explanation of language is often given, just as it may be convenient for the film critic to stop the film for a moment to examine one image in greater detail. If he forgets to set it in motion again, however, he will lose an essential element of the cinema: the constant movement of images on the screen. I believe that the

> changes in situations motivating language have all too often been frozen for descriptive ease. (Vandeloise 1991: 237)

This quote cautions us that we have to be aware of the fact that any linguistic analysis has to account for our knowledge of the world. Moreover, Vandeloise claims that speakers ascribe functional properties to objects rather than absolute physical properties of the objects themselves (Vandeloise 2003). These ascriptions are determined by cultural and language-specific affordances (Hunt & Agnoli 1991; Lucy 1992a, b; Vygotsky 1934; Watzlawick 1981; Whorf 1956). These in turn depend on speaker-imposed asymmetries (see below) that are attributed to the respective objects.

The different frames of reference are instantiated by various cognitive operations based on the FIGURE/GROUND asymmetry.

Chapter Three

The Topological Relation Markers Elicitation Tool

3.1. Introduction

In this chapter, I present data that challenge current objectivist approaches to topological spatial relations (Harley 1995). As I have stated earlier, these relations are supposedly objective, externally given, and therefore neutral to the speaker or any culturally-specific context. The speaker's vantage point or perspective supposedly does not matter in the encoding of topological relations. Moreover, the objects to be related are generally considered to bear inherent qualities not ascribed by the speaker. By contrast, I argue that speaker perspective and the specific instantiation of an object by the speaker play a crucial role in the encoding process.

In addition to showing how topological relations are encoded in the languages under survey, I will also cover how speakers mark projective relations specifically. Projective relations are based on the instantiation of the three frames of reference presented as in Chapter 2. Hence, I present the actual frames of reference and the vast battery of inferred extra-linguistic information that is imposed on various scenes. This reference system provides detailed semantic information about the scene according to the speech-act participants, as well as their particular spatial orientation to the observed scene.

3.2. Method

3.2.1. Participants

A total of 14 speakers of Dene were interviewed, 11 female and 3 male, solicited primarily from the Cold Lake First Nation Reserve in east-central Alberta, Canada. They were paid for their participation as language consultants. Both native and near-native speakers of this language were interviewed at their convenience either in Edmonton, Alberta, or in Cold Lake, Alberta.[24] All of them were bilingual, speaking English as well as Dene in their daily lives; only one of the speakers is affiliated with academia. Their ages ranged from 35-85 years.[25]

For comparative purposes, I also asked 10 speakers of standard German (aged 30-61 years, all having an academic education), 10 speakers of Canadian English (aged 24-45, including 5 undergraduate students of linguistics at the University of Alberta and 5 speakers not affiliated with linguistics or academia), and 6 speakers of standard Norwegian (Bokmål) (aged 22-65; including 3 undergraduate students and 3 speakers not affiliated with linguistics or academia).[26]

3.2.2. Materials, Design, and Procedure

Pederson et al. (1998) highlight that the researcher is supposed to prompt the language consultant in the following way: "I am interested in how to speak in your language about where one thing is in relation to another." The participant is told that s/he will see some pictures and is then asked to respond to the prompt "Where is object X in the picture?", e.g., 'Where is the cup?', 'Where is the boy?' or 'Where is the boat?'.

The *TRM* test was designed as an offline task. It involves 71 simple black-and-white line drawings presented to a speaker one at a time. In addition to the print version, I prepared a Power Point presentation of the series of pictures to be presented to speakers on a laptop computer. The results of these field sessions were transcribed by me and a speaker assistant (Valerie Wood, bilingual Dene linguist from the Cold Lake community) and entered into a score sheet. In addition to making pencil and paper notes, the sessions were digitally recorded via a portable mini-disc player or through the built-in microphone of a Power Book G4 laptop computer. For the purpose of summary and overview, the speaker data from each of the languages were transferred from the score sheets to an electronic database to provide a more permanent and more easily comparable data file.

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[24] It should be noted that Dene is a highly endangered language. The younger speakers' generation at Cold Lake rarely uses Dene on a daily basis. I could only elicit reliable data from 9 of the 14 speakers, that is, only the elderly speakers (aged 65-85). Only this age group is still comfortable in the language conversationally. These speakers are still able to tell stories in Dene, and most importantly, they are still able to produce the full range of relevant spatial encoding patterns. The influence of language attrition and the influence of English becomes apparent in comparing the younger speakers to the elders (Thiering 2004). The younger speakers, for our purpose, are the ones aged 35-55. They tended to use more sentences in which a postposition rather than a classificatory verb of full proposition bears most of the relevant information. Hence, some of the answers by younger speakers were ungrammatical, e.g., the wrong verb stem or paradigm and/or only the most simple tense/aspect inflections were used. Additionally, only a handful of default postpositions were repeated in each answer. This fact is important to note not only because of the process of language attrition, but also because of the data I used in this dissertation. I decided to use only the utterances from the 9 elder speakers, being aware that I hereby risked reducing the total number of responses per item that I used as a measure of how spatial language encoding works in Dene.

[25] Moreover, for the *TRM* task I used responses from 4 Totonac speakers collected by David Beck and Ryan Klint from the University of Alberta. All were bilingual Spanish-Totonac speakers (Totonac being the L1) and ranged in age from 44 to 67 years old. None of them were affiliated with linguistics or academia.

[26] Pederson et al. (1998) suggest that for any initial description of a particular language's topological system, 3 speakers are sufficient, but for more reliable data for comparative purposes, a minimum of ten speakers are needed. I was not able to fulfill this criterion, but I feel that my sample sizes are nevertheless sufficient for comparative purposes.

3.3. Results and Discussion: Overview

In this section, I will present some comparative results that shed light on the nature and frequency of the various morphosyntactic cohorts contributing to spatial marking in the languages under survey. Moreover, I want to discuss the major features used in instantiating various FIGURE/GROUND relations.

In the following, I will summarize the various occurrences of the Dene, German, Norwegian, English, and Totonac results. I present frequency data by language for the various morphosyntactic cohort devices used by speakers in the interpretation and encoding of the *TRM* pictures. I am specifically interested in the usage of static verb systems, i.e. existential, locative, or posture verbs, versus more dynamic verb systems, i.e., motion verbs and the various usages of locative markers or other locative particles (Coventry & Garrod 2004).

Table 5 presents an overview of the Dene cohort patterns.[27] I have not extracted the various locative markers, since if a marker is used in Dene at all, it is the all-purpose locative *k'e*, meaning roughly 'on', or *ye*, meaning 'in'.

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[27] It is important to note here that the current chapter does not present a detailed frequency count on Totonac for two reasons: (a) the second-hand data has been collected under a slightly different protocol, i.e., the researcher prompted the participant with a question to describe the scene. This question lead to a variety of responses in a speaker and across speakers. The open-ended question resulted in a rather different picture of the actual data, as opposed to results from the prompt "Where is object X ?" (but see footnote 25 below) Moreover, (b) I have only used Totonac in the *TRM* task and not throughout the other two tests, hence, for comparative purposes, I will refer to the consistent data of German, English, and Norwegian as opposed to Dene.

Table 5: Dene Frequency Count

Device	*Speaker*	1	2	3	4	5	6	7	8	9	TOTAL	%
Verb-type	Static	14	12	13	12	12	11	11	11	12	**108**	**11.4**
	Dynamic	95	94	95	93	92	92	93	92	94	**840**	**88.6**
											948	**100**
	COHORT SYSTEMS											
1	FIG-CLV	61	59	58	62	65	62	64	65	63	**559**	**48.7**
2	GND-LOC-FIG-CLV	17	15	17	16	18	16	19	18	17	**172**	**47.2**
3	FIG-GND-LOC-CLV	12	17	19	13	15	16	15	17	18	**142**	**35.5**
4	FIG-GND-CLV	12	10	8	13	8	7	6	7	4	**75**	**17.1**

Note that Dynamic responses here mean that speakers frequently left out a locative marker, hence, only the classificatory verb cohort expresses any spatial relationship. Speakers assured me that no locative marker is needed in most cases.

This table presents the frequency of used cohorts in Dene (note that the total from the 9 speakers is 948 utterances, not 639 (9 x 71), which is due to the fact that speakers often gave alternative responses in addition to their first description). The most frequent pattern is the FIGURE + classificatory verb cohort (558/840) utterances). Hence, most speakers encode the FIGURE's relations via the classificatory verb cohort, i.e., no locative marker is used to relate the FIGURE and GROUND explicitly. The second most frequent pattern (172) consists of the GROUND related by a locative with the FIGURE followed by the third most frequent pattern consisting of FIGURE/GROUND + locative and classificatory verb. This is different from the results as shown in Table 6-8 below.

Table 6: German Frequency Count

Device	*Speaker*	1	2	3	4	5	6	7	8	9	10	TOTAL	%
Verb-type	Static	66	67	66	68	65	69	70	65	67	66	**669**	**94.0**
	Dynamic	5	4	5	3	6	2	1	6	4	5	**41**	**6.0**
												710	**100**
Locative		69	68	69	67	70	69	68	68	70	69	**687**	**96.7**
	no locative marker	2	3	2	4	1	2	3	3	1	2	**23**	**3.3**
	COHORT SYSTEMS												
	FIG-EXIST-LOC-GND	33	32	30	34	37	34	36	37	35	38	**346**	**48.7**
	FIG-EXIST-*auf* 'on'-GND	15	14	15	13	18	14	19	18	19	18	**163**	**47.2**
	FIG-EXIST-*an/am* 'at'-GND	8	9	10	12	14	13	13	15	14	15	**123**	**35.5**
	FIG-EXIST-*in/im* 'in'-GND	10	8	5	9	5	7	4	4	2	5	**59**	**17.1**
													99.8
	FIG-POST-LOC-GND	20	23	24	19	18	14	23	15	17	16	**189**	**26.6**
	FIG-POST *(sitzen* 'sit'*)*-LOC (*auf* 'on', *neben* 'near', *unter* 'under')-GND	7	13	12	9	11	9	14	10	12	10	**107**	**57.0**
	FIG-POST *(stehen* 'stand'*)*-LOC-GND	6	4	7	6	4	3	5	2	3	3	**43**	**22.8**
	FIG-POST *(liegen* 'lie'*)*-LOC-GND	7	6	5	4	3	2	3	3	2	3	**38**	**20.2**
													100

Static: Use of preposition only including an existence construction, e.g., 'be at'
Dynamic: No use of a preposition, only a motion verb expresses the FIGURE/GROUND asymmetry
N: 10 speakers

Note that the overall total number between Dene and German responses of cohort systems are similar, but semantically different: whereas in Dene the FIGURE/GROUND asymmetries are encoded via classificatory verb stems (and no postposition) the German speakers used primarily existential cohorts with a preposition.

Table 7: Norwegian Frequency Count

Device	*Speaker*	1	2	3	4	5	6	TOTAL	%
Verb-type	Static	67	68	68	67	68	70	**408**	**95.7**
	Dynamic	4	3	3	4	3	1	**18**	**4.3**
								426	**100**
Locative		71	70	71	69	70	71	**422**	**99.1**
	COHORT SYSTEMS								
	FIG-be-*on*-GND	28	34	25	34	34	31	**186**	**43.6**
	FIG-be-*in/inside*-GND	10	16	12	12	13	15	**78**	**18.3**
	FIG-be-*around*-GND	4	5	4	4	5	4	**26**	**6.1**
	FIG-be-*next to/beside/near*-GND	3	2	4	3	3	4	**19**	**4.5**
	FIG-be-*through*-GND	3	2	3	3	2	3	**16**	**3.7**
	FIG-be-*above*-GND	3	2	2	2	1	2	**12**	**2.8**
	FIG-be-*over*-GND	2	2	1	1	1	2	**9**	**2.1**
								346	**81.2**
	Misc prep, e.g. *behind, against*	15	13	15	12	13	12	**80**	**18.8**
	TOTAL							**426**	**100**

All speakers (n = 10) use prepositions to instantiate the FIGURE/GROUND asymmetry, i.e., N_{prep} = 100%.
Static: Use of preposition only including an existence construction, e.g., 'be at'
Dynamic: Motion verb expresses the FIGURE/GROUND asymmetry (+/–adposition)
The verb-type row presents the results of the static vs. dynamic distribution. The prepositions row indicates the usage of prepositions for every speaker and the total number. This is followed by a general cohort system account in which I present the most frequent patterns for every speaker.

Table 8: English Frequency Count

Device	*Speaker*	1	2	3	4	5	6	7	8	9	10	TOTAL	%
Verb-type	Static	67	66	63	60	68	66	71	69	65	62	**657**	**92.5**
	Dynamic	4	5	8	11	3	5	0	2	6	9	**53**	**7.5**
												710	**100**
Locative		47	56	55	45	57	56	66	59	70	61	**572**	**80.5**
	COHORT SYSTEMS												
	FIG-be-*on*-GND	21	32	30	24	33	29	36	27	35	28	**295**	**41.5**
	FIG-be-*in/inside*-GND	9	11	12	11	14	14	16	15	18	15	**135**	**19.1**
	FIG-be-*around*-GND	6	4	6	5	4	4	6	5	3	4	**47**	**6.6**
	FIG-be-*next to/beside/near*-GND	5	3	3	3	1	4	3	4	5	6	**37**	**5.2**
	FIG-be-*through*-GND	3	3	2		2	3	1	2	3	3	**22**	**3.1**
	FIG-be-*above*-GND	2	2	1	2	1	2	2	3	2	3	**20**	**2.8**
	FIG-be-*over*-GND	1	1	1		2		2	3	3	2	**15**	**2.1**
	Misc prep, e.g. *behind, against*	24	15	16	26	14	15	5	12	1	10	**138**	**19.5**
	TOTAL											**710**	**100**

All English speakers (N = 10) use prepositions to instantiate the FIGURE/GROUND asymmetry, i.e., N_{prep} = 100%. = 710
Static: Use of preposition in an existence construction, e.g., 'be at'
Dynamic: Motion verb expresses the FIGURE/GROUND asymmetry (+/–adposition)

The verb-type row presents the results of the static vs. dynamic distribution. The prepositions row indicates the usage of prepositions for every speaker and the total number. This is followed by a general cohort system account in which I present the most frequent patterns for every speaker.

Table 8 shows the overall frequency of the English verb and preposition cohorts. First and foremost, we see a marked reliance on static encoding patterns (92.5%) as opposed to dynamic ones (7.5%). This becomes most apparent if we compare these results with the results from Dene speakers in Table 5. Moreover, most of the examples follow a FIGURE-be-locative-GROUND construction pattern (80.4 %) and the locative 'on' is heavily relied on (at 41.5 %) to profile the FIGURE's orientation with respect to the GROUND.

Both the German and the English summary of data presented in Tables 6 and 8 above respectively show that the predominant marking pattern for these speakers involves a static existence verb plus locative cohort followed in frequency by a posture verb plus locative cohort. Similar results were found with respect to Norwegian speakers (see Table 7 above) as well as the small number of Swedish and Danish speakers I asked for comparative purposes. This is not surprising since all of these Germanic languages historically developed from the same protolanguage. In these languages, there is more variety in the use of locatives than in Dene.

The most striking result is that spatial topological relations are expressed by a richer cohort system in Dene than in the European languages. The German results show a consistent use of posture verbs whereas English (and Norwegian) primarily use an existence marker in addition to adpositions—'be at', 'be in', 'be on'—and so forth.

In Dene, this system includes additional prefixes aligned with classificatory verbs expressing perspectivized and more dynamic information. These prefixes encode extensive information about the nature or configuration of the FIGURE, the directionality of the path it takes in entering into a relation with the GROUND, but also tense and aspect of the entire profiled situation. In the results from Totonac (see footnote 25 below), the cohort consists of a robust body part system specifying the immediate point of contact or relation that the FIGURE bears to the GROUND. Totonac also uses a 4-way posture verb inventory that suggests shape (Peterson 1994) and alignment information about the FIGURE. With respect to degree of specificity, Dene and Totonac speakers tended to mark the FIGURE/GROUND asymmetry on a high degree of specificity as opposed to the European speakers. They encoded also temporal and perspective features. This supports my claim that space is not the only coordinate system in the encoding of presumable topological relations. Most of the utterances in Dene and Totonac are profiled via cohorts that bear both spatial and temporal information. This entrenchment is profiled according to the language-specific affordances. For example, I expected to find the semantic burden of conveying spatial information relegated largely to adpositions, but as the Dene data nicely show, it is important to consider the morphosyntactic cohorts that interact with the adpositions to describe a scene in a spatially and temporally whole manner. The Totonac data also show a stable cohort of metaphorical body part extensions and show a high degree of specificity.[28]

One of the most striking findings is that descriptions of the relations between static FIGUREs and GROUNDs in Dene are not coded by a simple postposition, of which the language has a very large inventory. Spatial encoding typically involves a more dynamic and perspectivized—speaker-deictic—construal, as opposed to a rather static and objectivized one (Taylor & MacLaury 1995).

3.4. Topological Spatial Relations

This section presents a selection of descriptions for principally topological spatial relations across the target languages. The role of any non-spatial influence on spatial cognition (perceptual and kinesthetic domains) or, to be more precise, spatial constructions is at issue here. In particular, I am interested in determining some of the construal mechanisms that are involved across these languages in the predication of a variety of FIGUREs located in relation to different reference objects. The data presentation is ordered from the most canonically topological relations to less topological ones.

The language examples I present in this dissertation are structured as follows. The top line, Line 1, shows abbreviations for the various imaging parameters that I am tracking across each speaker's response to each item. These parameters include construction types such as the FIGURE (FIG), GROUND (GND), LOCATIVE (LOC), POSTURE

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[28] Thanks to Ryan Klint for the following frequency count on Totonac body parts. Speaker 1 used 18% nominal and 57 % prefix body part construction (25% no body part construction), Speaker 2 used 56% nominal and 38% body part prefixes (6% no body part construction), Speaker 3 used 19% nominal and 70% prefixes (12% without), and finally Speaker 4 (different dialect) used 28 nominal and 61% prefix body part constructions (11% without).

VERB (POST), CLASSIFICATORY VERB (CLV), DEGREE OF SPECIFICITY (DOS) etc ("+" means the conflation of two or more concepts). Line 2 gives the elicited language example in the standard orthography. Line 3 represents an interlinear gloss, while Line 4 gives an approximately equivalent grammatical description in English including tense, aspect and modus markers. The semantic distinction of the classificatory stems in particular follows the taxonomy as proposed by Davidson, Elford & Hoijer (1963: 31ff.; see also Li 1946). The results from German, Norwegian, English, and Totonac speakers are given for comparative purposes.[29] The direct comparison allows me to point out similarities and differences among the languages. This section is further subdivided into several functional, topological and projective notions and relations from the most neutral relations to the most non-neutral relations in Dene.

An important note on the representation of the data, and the Dene data in particular: If speakers have given more than one description for a scene, I have included the result as well (independent whether the majority of speakers used the specific structure). The same procedure is given for the other languages, only that the responses differed with respect to the choice of verb. This presentation is followed throughout Chapter 3 to 5.

3.4.1. Inanimate FIGURE Supported by Horizontal GROUND

The data in this section and the following present the encoding of spatial topological relations like containment, contiguity, support, occlusion, proximity, and projection. The focus is primarily on the general location of the FIGURE as encoded by the postposition in addition to the verb system. We will see that Dene shows predominant encoding processes of the spatial relation by the postposition *k'e*—'on'—plus a locative—posture—verb including a directional and/or spatial prefix. German, Norwegian, and English almost exclusively show existence verb usages and locative markers equivalent to English 'on'. In Totonac we will see the usage of body part constructions that profile the relationship between FIGURE and GROUND with reference to the human body as the point of reference.

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[29] Note that similar encoding patterns to Norwegian can be found in Swedish and Danish. I have randomly asked speakers of Swedish and Danish to confirm the general relationships between the FIGURE/GROUND asymmetries and all of the descriptions were similar to Norwegian. I also asked 2 speakers of French and 3 speakers of Spanish for comparative purposes.

The responses in the example in (5) present a typical relation of contiguity and support in which the static GROUND supports the FIGURE from below. The results are coherent throughout the various Dene speakers (even the younger ones), hence, they represent the dominant response pattern. The classificatory verb with the *-the-* imperfective prefix expresses the fact that the FIGURE is not in motion, but at rest (Davidson et al. 1963: 31; S. Rice 1997: 103).

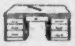

Figure 3: PENCIL ON DESK
Prompt: *Where is the pencil?*

(5) a.	FIG	GND	LOC	DEIC+POST=STAT[FIG]	Dene
	erihtł'íschené	*hǫlzuzi*	*k'e*	*da-the-tą*	
	pencil	office.desk	on	up-IMPF.3sg.S-SO.exist	
	'The pencil is (up) on the desk'.				

b.		FIG	POST/EXIST	LOC		GND	German
	der	*Stift*	*liegt/ist*	*auf*	*dem*	*Tisch.*	
	the	pen	3sg.S.IMPF.lie/be	on	the	table	
	'The pen lies on the table.'						

c.	FIG	POST/EXIST		LOC	GND	Norwegian
	penn-en	*ligger/er*	*på*	*bord-et*[30].		
	penn-the	3sg.S.IMPF.lie/be		on	table-the	
	'The pen lies/is on the table.'					

d.		FIG	EXIST	LOC		GND	English
	the	*pencil*	*is*	*on*	*the*	*desk.*	
	the	pencil	3sg.S.IMPF.be	on	the	desk	
	'The pencil is on the desk.'						

e.	FIG	LOC_1[BP]+EXIST+LOC_2=DOS	GND	Totonac
	lápis	*a'kpu:waká'lh*	*mésa*	
	lápis	a'kpu:-waká'lh	mésa	
	pencil	crown-be.high	table	
	'The pencil is on the table.'			

In (5a) the *-tą* classification verb stem in the imperfective profiles the static position of a stick-like FIGURE. An interesting aspect in terms of the speaker's perspective is the use of the prefix *da-* which adds a degree of specificity since it is a deictic marker. It adds information about the speaker's vantage point and places the pencil in a certain elevated position relative to the speaker's vertical midline. Hence, the FIGURE is not only positioned on a horizontal surface by virtue of the *k'e* 'on' position, but the prefix *da-* also profiles a vector field. This field instantiates the speaker's perspective depending on the vantage point. The salient reference point is the same larger landmark as the one typically expressed in English—'the table'. The moveable objects are consistent with English 'the pencil' respectively.

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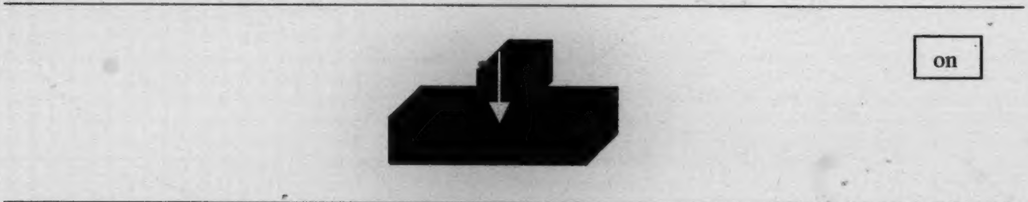
[30] In Norwegian, the determiner is affixed to the noun as opposed to German and English where the determiner is positioned as a separate morpheme in front of the noun.

In (5b-d), the FIGURE is also generally located in a static 'on'-relation to the GROUND. In the English example, the FIGURE is in a static location as encoded via the existential locative cohort 'X be on Y'. The German and Norwegian examples are more specific in that all speakers chose to encode the FIGURE via a posture verb that indicates a certain orientation of the FIGURE. Posture verbs in theses languages relate the FIGURE to the GROUND depending on its shape and orientation being fully attached to a horizontal GROUND—e.g., 'the pencil lies on the table'—, but not depending on animacy of material constituency as in Dene.[31]

The pencil or the cup examples (as introduced in Chapter 1) present static relationships between the FIGURE and the GROUND. The GROUND is a horizontal and static surface and all FIGURES are non-animate objects. Speakers of Dene encode the FIGURES depending on their shape or texture. Again, the postposition serves only as the general locational marker for the FIGURE in relation to the GROUND. Schema 1 is in line with most cognitive linguistic descriptions.



Schema 1: Representation of static 'on'-relation in German, English, and Norwegian[32]

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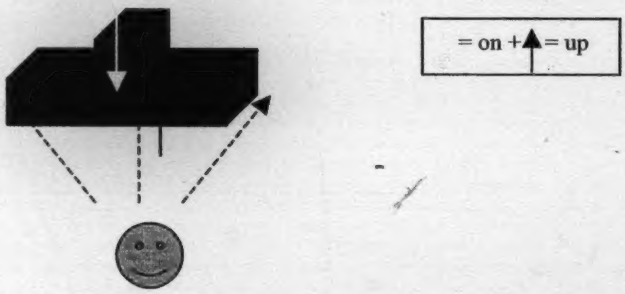
[31] For example, in German, a cup usually does not 'lie' on a table, unless someone pulls it over and it rolls on its side. It does not 'sit' either, but 'stands'.

[32] Throughout the abstract schematic figures I will use the following possible FIGURE/GROUND alignments: The green box describes static horizontal or vertical GROUNDS, the red box the horizontal or vertical FIGURES. A yellow arrow presents various FIGURE/GROUND alignments such as 'at', 'on', 'beside', 'in front of' based on Euclidean geometry (broken lines indicate that the topological relation is only secondary). Finally, a blue arrow encodes a dynamic FIGURE, and most importantly, the face represents the viewer and

Schema 1 represents the FIGURE/GROUND asymmetries of (5b-d) as described in the previous examples. Basically, the FIGURE is aligned in a static topological relation to the horizontal GROUND, the perceiver is not mentioned or implied. Hence, the asymmetry is rather neutral in terms of perspective.

As opposed to this, Schema 2 below presents the Dene and Totonac focal points deviating from the European languages in terms of the instantiation of the vantage point. This instantiation is an indicator for the subjective construal mechanisms that take over.



Schema 2: Representation of static 'on'-relation in Dene and Totonac

Schema 2 shows examples (5a+e) that the speakers instantiate additional information to the general FIGURE/GROUND asymmetry. The additional information regards the speaker's vantage point in which s/he profiles the FIGURE's location in a specific vector coordinate system.[33] The FIGURE being 'up' or 'on top of' implies a certain orientation of the viewer and hence encodes her/his perspective. By that, the language forces the speaker to encode this presumably topological relation in a slightly more detailed way than the European speakers do. The situation is not neutral to the speaker, as we would expect in a topological relation. It is rather a contextualized situation specifying the FIGURE with

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her/his instantiation of the vantage point. The last point is important to align the FIGURE/GROUND asymmetry depending on the viewer's location in a scene (see the concluding chapter for the various possible features). The face is supposed to be approximately on the same level as the various FIGURE/GROUND objects (or the stage), but for technical reasons (missing 3-D animation for this print copy) the viewer's perspective seems to be located below the actual scene.

[33] A vector is a mathematical coordinate system based on geometry. However, here I want to introduce a vectorial system that depends on the subjective construal mechanisms initiated by various cognitive processes (Spivey 1997).

respect to the viewer or construer on a certain elevated level. Hence, the prominence of the encoding pattern is the FIGURE's relation to (a) the GROUND, and (b) the construer.

So far, quite canonical encoding patterns have been presented in which static objects are related to static reference points. The next set presents encodings of FIGURE/GROUND-relations that differ slightly from this.

3.4.2. FIGUREs Coincident and Attached with GROUND

The following set (6) indicates a general orientation and an extended vertical—'upright'—location of the FIGURE in relation to the GROUND.

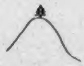


Figure 4: TREE ON TOP OF MOUNTAIN
Prompt: *Where is the tree?*

(6) a. Dene

GND+LOC[=DOS]	FIG	[?]POST=STAT[FIG]
shéthlaé	*el*	*na-ghį-ʔa*
hill.on.top.of	spruce.tree	in.place.of[?]-IMPF.3sg.S-SO.stand.upright

'The tree stands on top of the mountain (standing upright).'[34]

b. German

	FIG	POST	LOC		GND
Der	*Baum*	*steht*	*auf*	*dem*	*Berg.*
the	tree	3sg.S.IMPF.stand	on	the	mountain

'The tree stands on the mountain.'

c. Norwegian

FIG	EXIST/POST	LOC	GND
Tre-et	*er/står*	*på*	*fjell-et*
tree-the	3sg.S.IMPF.be/stand	on	mountain-the

'The tree is/stands on the mountain.'

d. English

	FIG	EXIST	LOC=[DOC]				GND
The	*tree*	*is*	*on*	*top*	*of*	*the*	*hill.*
the	tree	3sg.S.IMPF.be	on	top	of	the	hill

'The tree is on top of the hill.'

e. Totonac

LOC+BP	GND	POST		FIG
naxa'kpú:n	*sipéj*	*ya:lh*	*pu:laktín*	*ki'wi'*
nak=ix.a'kpú:-n	sipéj	ya:lh	pu:lak-tín	ki'wi'
LOC=3PO-crown+nk	hill	stand	CLS-one	tree

'The tree stands on top of the hill.'

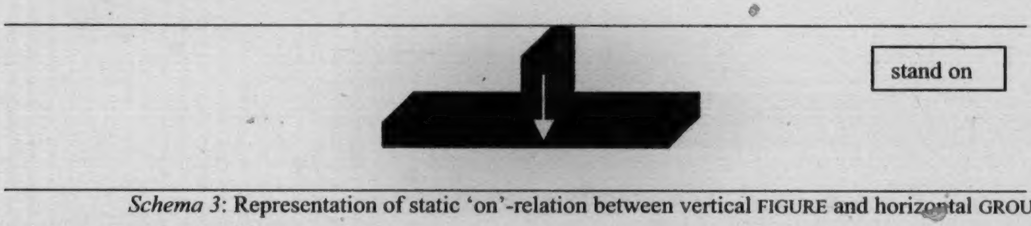
---

[34] The prefix *na-* has a number of different meanings. These are difficult to determine, which is why I have not given a transcription of this prefix, but will mark it with a [?] and provide possible meanings. Related meanings are 'in place of', 'in return for', 'in front of', 'to live', 'to move', 'to work', anticipating or expecting. Depending on the actual verb stem, this meaning of this prefix changes. However, in this example, it may be an adverbial prefix, a continuative (iterative) form as in 'in place of''.

In this example, a physical contact between FIGURE and GROUND is expressed via the classificatory system in Dene. The relation is profiled by a locative static posture verb encoding the FIGURE's general relation to the GROUND as being attached to it in an upright position. In addition, the FIGURE is encoded as being in a specific location on the GROUND and supported by it—'on top of' it. This degree of specificity encodes the FIGURE's exact alignment with respect to the GROUND.

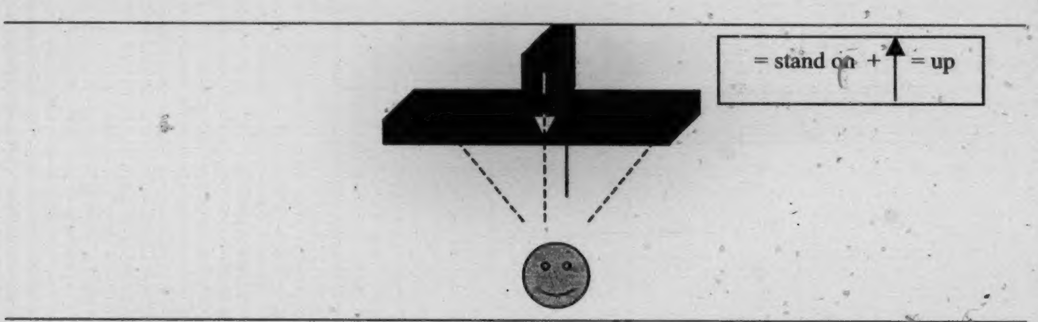
In (6b-c), the FIGURE's location is also profiled as being in an 'on' and 'attached' relation to the GROUND, i.e., the mountain. The use of a posture verb in German and in some cases in Norwegian as well specifies the vertical dimension. This does not only indicate a topological relation, but also the specific quality of the FIGURE in its elongated extension. The English example in (6d) is somewhat different in that speakers tended to use the more specific 'on top of' orientation (which might be colloquial, but nevertheless implies the specific form of the GROUND not being flat), while the general encoding is profiled via an existence marker. The Totonac set in (6e) includes a body part metaphorical extension. Here, the top of the mountain is similar to the crown on top of a human head. The encoding process in Totonac specifies two different spatial alignments. One is the general implicature of the posture verb 'to stand', the other is the additional locative marker 'on top of' which gives the precise orientation of the FIGURE/GROUND asymmetry.

To sum up, all examples except the English one encode the FIGURE being in an upright position, while all examples except the German and Norwegian ones specify the exact location of the FIGURE on the GROUND.



Schema 3: Representation of static 'on'-relation between vertical FIGURE and horizontal GROUND

Schema 3 (6b-d) presents the vertical FIGURE in a topological contact relation to the GROUND (admittedly without showing the FIGURE's specific position 'on top of' the—not completely flat, but peaked—GROUND). No perspective is profiled, hence, the scene seems rather neutral with regard to the speaker's perspective. Schema 3 does not capture the Dene construal in which a certain perspective is implied. The following Schema 4 (6a and e) presents this subtle difference in Dene. I interpret the deictic expression as indicating a speaker-dependent alignment.



Schema 4: Static 'on'/'up'-relation between FIGURE and GROUND in Dene and Totonac

The Dene speaker instantiates a certain vantage point to align the FIGURE/GROUND asymmetry with respect to a relative frame of reference. In other words, the speaker encodes the orientation of the FIGURE in relation to the construer's position. Hence, the vantage point is a grounding feature that specifies the visual scene and not the geometrical coordinate system alone.

Languages differ slightly in the encoding of space, i.e., there seem to be language-specific parameters or affordances—mandatory morphosyntactic qualities of the particular languages—that play a part in expressing the relation between FIGURE and GROUND. I believe that the subtle semantic differences in Dene are primarily due to these language-specific affordances.

The next section provides some examples in which the FIGURE is in an interior relation to the GROUND.

3.4.3. Complete Containment

The following examples present several construction types of spatial relations indicating the FIGURE as located in or contained by the GROUND. Example (7) is a situation type of full inclusion of the FIGURE in the GROUND.

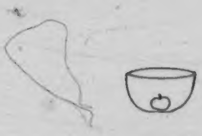


Figure 5: APPLE IN BOWL
Prompt: *Where is the apple?*

(7) a.

FIG	GND	GND	GND	LOC	POST=STAT[FIG]	Dene
jiéchok	*ts'a*	*tthai*	*tsoghe*	*ye*	*the-ʔa*	
fruit.big	metal	dish	bowl	in	IMPF.3sg.S-RO.exist/lie	

‘The big fruit is/lies in the metal bowl.’

b.

	FIG	POST/EXIST	LOC		GND	German
Der	*Apfel*	*liegt/ist*	*in*	*der*	*(Obst)Schale.*	
the	apple	3sg.S.IMPF.lie/be	in	the	(fruit)bowl	

‘The apple lies/is in the (fruit)bowl.’

c.

FIG	POST/EXIST	LOC	GND	Norwegian
Epl-et	*ligger/er*	*i*	*skål-en.*	
apple-the	3sg.S.IMPF.lie/be	in	bowl-the	

‘The apple lies/is in the bowl.’

d.

	FIG	EXIST	LOC		GND	English
The	*apple*	*is*	*in*	*the*	*bowl.*	
the	apple	3sg.S.IMPF.be	in	the	bowl	

‘The apple is in the bowl.’

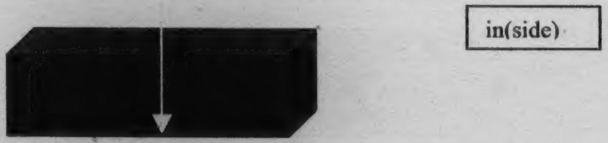
e.

	FIG	POST		LOC+GND	Totonac
a'htín	*mansa:nás*	*pu:wi:lh*	*a'htín*	*nakpu:cha'há:n*	
a'htín	mansa:nás	pu:-wí:lh	a'htín	nak=pu:cha'há:n	
CLS-one	apple	CTD-sit/exist	CLS-one	LOC=interior	

‘An apple sits/is inside (a container).’

The FIGURE in the Dene example in (7a) is located inside the GROUND—an open container—in a complete containment relation. The postposition is a locative marker and hence we see a static topological relation between the FIGURE and the GROUND. The FIGURE’s general location is also encoded via the classificatory verb stem expressing a round object ‘lies’ in a concave container with a horizontal center. In all the examples, the FIGURE is related to the GROUND in an interior orientation. This indicates the FIGURE being surrounded by the ground in this particular situation.

The European languages encode the FIGURE being in a static location by means of a locative marker, i.e., a pre- or a postposition. The posture verbs in (7a,b) as well as in the German example express the general orientation of the FIGURE and again imply a horizontal GROUND. In (7e) the figure is in a complete containment relation, i.e., ‘inside the container'. Schema 5 presents the general topological 'in'-relation of the FIGURE to the GROUND as given in all examples above.



Schema 5: Representation of FIGURE in static 'in'-relation to the GROUND

A more interesting example of an 'in'-relation of the FIGURE to the GROUND is presented in (8). Here the GROUND is partly left out, i.e., an intransitive verb implies the relation. The speakers encode consistently that the material of the FIGURE is responsible for the causation of the broken cup. The causation is encoded as we can see in the usage of the idea of tension that has been responsible for the crack in the cup.

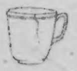


Figure 6: CRACK IN CUP
Prompt: *Where is the crack?*

(8) a. FIG VMC=DYN[FIG] — Dene
tt'haí *ná-ghe-té*
cup [?]-PERF.3sg.S-SO.break (to.pieces)
'The cup is broken (to pieces).'

b. FIG VCA=DYN[FIG] — Dene
liditt'h'aí *hú-ł-táł*
tea.cup PERF.3sg.S-CL-SO.break (because.of.tension, depends on the material)
'The teacup is broken (because of tension).'

c. FIG EXIST LOC GND — German
Der Sprung ist in der Tasse.
the crack 3sg.S.IMPF.be in the cup
'The crack is in the cup.'

d. FIG EXIST LOC GND — Norwegian
En revne er i kopp-en.
a crack 3sg.S.IMPF.be in cup-the
'A crack is in the cup.'

e. FIG EXIST LOC GND English
The crack is in the cup
the crack 3sg.S.IMPF.be in the cup
'The crack is in the cup.'[35]

f. FIG GND+BP=LOC Totonac
wamá: taza takilhx'ani:'
wamá: taza ta-k:ilh-x'a-ní:'
this cup inch.lips.break.PRF
'The cup is broken.'

In both (8a-b), no explicit spatial topological relation is encoded. Instead, both objects are encoded as being inseparably amalgamated. Even after asking the speakers several times, they still used these patterns to encode the state of a container being cracked or broken. In addition, the stem in example (8b) profiles the causation of how the cup has become cracked—because of its material's tension. Again the dominant semantic information is with regard to the cup that is, according to the question, assumed to be the GROUND.

In contrast, the European language examples given in (8c-e) encode a topological relation in which the FIGURE—the crack—is in the GROUND—the cup. Totonac (8f), on the other hand, is more like the Dene example, but specifies the crack in the cup by means of a body part extension—a reference to lips.

Schema 6: Representation of static 'in' FIGURE/GROUND asymmetry

Schema 6 (examples 8c-e) presents the static topological relation of the FIGURE being inseparately attached to the GROUND in an 'in' relation in German, Norwegian, and English. The cup serves as the GROUND whereas the crack is the FIGURE. In Dene and Totonac, a different quality of the FIGURE/GROUND asymmetry is ascribed. Schema 7 presents the dynamic process as given in the Dene example in (8b) as opposed to the static one above.

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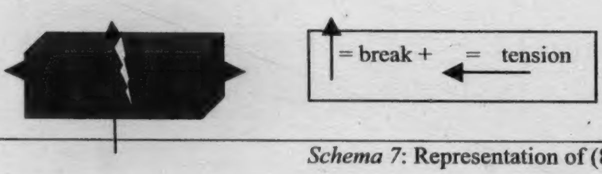
[35] The European speakers all prefer to say that the cup is cracked. Nevertheless, since the prompt is "Where is the crack", speakers easily located the crack being in the cup.



Schema 7: Representation of (8b)

Schema 7 (examples 8a+f) indicates that the GROUND of Schema 6—the cup—is the FIGURE in (8a,b and f). The blue arrow encodes the state of the cup being broken. It does not so much encode a topological relation between FIGURE and GROUND, but more the result of an event. FIGURE and GROUND are amalgamated. The black arrows refer to the stem in (8b) indicating the causer of this event—the tension (which is not encoded in Totonac).

The next set seems to be a static ‘in’- relation at first sight, but here we clearly see a dynamic encoding pattern in Dene. The FIGURE bears this functional quality, i.e., an arrow is or has been in motion.

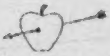


Figure 7: ARROW IN/THROUGH APPLE
Prompt: *Where is the arrow?*

(9) a. Dene

FIG	GND	VCA=DYN[FIG+LOC=MOTION]
k’á	*jie*	*ghą-nį-gé*
arrow	fruit	PERF.3sg.S-[?]-SO.poke/spear.through

‘The arrow is poked through the fruit.’

b. Dene

FIG	GND	VCA=DYN[FIG+LOC=MOTION/PATH]
k’a	*jiechok*	*ghą-hę-l-tás*
arrow	fruit.big	PERF.3sg.S-[?]-CLSO.shoot (horizontal.motion)[36]

‘The arrow is shot through the big fruit (horizontally).’

c. German

	FIG	EXIST	LOC	GND
Der	*Pfeil*	*ist*	*im*	*Apfel.*
the	arrow	3sg.S.IMPF.be	in.the	apple

‘The arrow is in the apple.’

d. Norwegian

FIG	EXIST	LOC	GND
pil-en	*er*	*i*	*epl-et*
arrow-the	3sg.S.IMPF.be	inside	apple-the

‘The arrow is inside the apple.’

---

[36] The cohort *húnestás* means ‘I shoot (an arrow at it)’. A related stem is *–tságh* meaning drive or nail a stick-like object through.

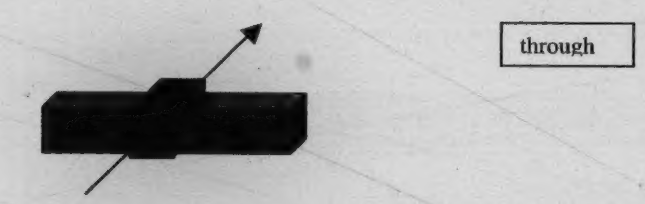
e.		FIG	EXIST	LOC		GND	English
	The	*arrow*	*is*	*in*	*the*	*apple.*	
	the	arrow	3sg.S.IMPF.be	on	the	apple	

'The arrow is in the apple.'

f.	CLS	POST+FIG		GND_1	GND_2	Totonac
	a'htín	*ya:nilh*	*a'htín*	*flecha*	*pu:tí'pni'*	
	a'h-tín	ya:-ní-lh	a'h-tín	flecha	pu:tí'pni'	
	CLS-one	stand-APL-stand	CLS-one	arrow	point	

'An arrow stands/sticks in the round one.'

In (9a,b,f) the general orientation is only inferred by the motion verbs. These verbs implicitly encode the FIGURE's 'in(terior to) the GROUND'-relation. A specific manipulation of the GROUND by a verb of handling is expressed. The specific use of this verb in the perfective in (9a,b) encodes the result of a movement of the FIGURE and the direction of this movement in relation to the GROUND. (9b) gives more specific information about the direction (horizontal). Hence, it is not so much the topological relation that is important for the construer, but the dynamic event of the arrow. In (9c-e), the general orientation is encoded by means of an existential verb in combination with a locative expressing the 'in' or 'inside' relation of the FIGURE to the GROUND. No motion event is encoded here. Schema 8 presents the motion event of examples (9a,b).



Schema 8: Representation of FIGURE in dynamic relation to GROUND

The section summarized a variety of inanimate FIGUREs being entrenched in a spatial-temporal setting in a containment relation. Furthermore, atelic or telic events have been profiled in addition to the temporal process alone, indicating a linear dimension. The next set also presents inanimate FIGUREs, but here they are in a superior relation to the instantiated GROUND.

3.4.4. FIGURE Superior to GROUND

In the following section, inanimate FIGURE/GROUND relations and their spatial locations as indicated in English by the locative 'over' or 'above' are presented. Generally, the spatial relation expressed by the preposition 'over' encodes the location of the FIGURE as being 'in the sphere of' the reference object (Talmy 1983: 248).

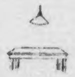


Figure 8: LAMP OVER TABLE
Prompt: *Where is the lamp?*

(10) a.

FIG	GND	LOC	DEIC+POST=STAT[FIG]	Dene
bek'eshich'elyį	*bek'ák'áni*	*yaghe*	*da-the-tą*	
table	lamp	under	up-IMPF.3sg.S-SO.exist/lie	

'The table is/lies under the lamp.'

b.

GND	LOC	FIG	[?]POST=STAT[FIG]	Dene
bek'eshich'elyį	*daghe*	*bek'ák'áni*	*ná-ghe-beł*	
table	above/over	lamp	down.from.up[?]-IMPF.3sg.S-RO.hang.down[37]	

'The lamp hangs down from up above the table.'[38]

c.

	FIG	EXIST/VFM	LOC		GND	German
Die	*Lampe*	*ist/hängt*	*über*	*dem*	*Tisch.*	
the	lamp	3sg.S.IMPF.be/hang	above	the	table	

'The lamp is/hangs above the table.'

d.

FIG	VFM	LOC	GND	Norwegian
Lamp-en	*henger*	*over*	*bord-et.*	
lamp-the	3sg.S.IMPF.hang	above	table-the	

'The lamp hangs above the table.'

e.

	FIG	EXIST	LOC		GND	English
The	*lamp*	*is*	*above*	*the*	*table.*	
the	lamp	3sg.S.IMPF.be	above	the	table	

'The lamp is above the table.'

f.

	FIG	LOC[DOS]	LOC+GND	Totonac
a'htín	*lámpara*	*waká'lh*	*nakchik*	
a'htín	lámpara	waká'lh	nak=chik	
cls-one	lamp	be.high	loc=house	

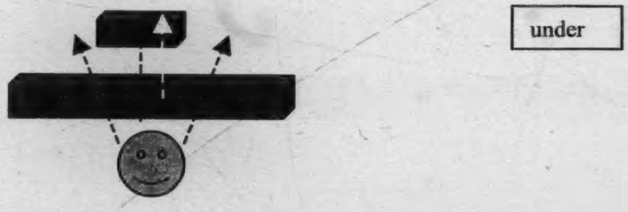
'A lamp is up in the house.'

---

[37] The prefix *na-* here probably has a spatial meaning as in 'in place of' and 'down from up'; it may also have a temporal meaning being aspectual or iterative 'again' (customary) (Li 1946). However, I believe that in this case, the prefix most probably expresses that the FIGURE hangs down from above.

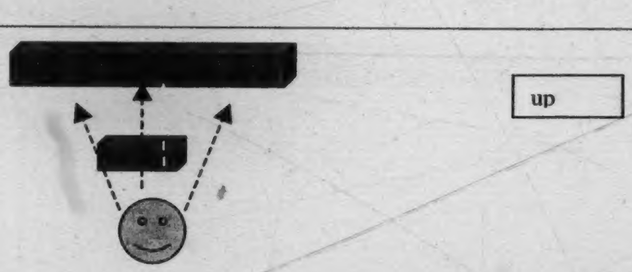
[38] Moreover, the prefix *na-* is also used in different active themes such as 'to take FIGURE down' vs. 'to put FIGURE in' (Cook 2004: 245). It has thus thematic meaning indicating a semantic difference between the two actions.

In the Dene expression in (10a), the primary object—the table—is encoded as being the FIGURE, which is unusual because it is the larger object in the picture and is referred to in the question as the secondary object. In other words, there is a FIGURE/GROUND reversal. In the Dene example (10b) as in all the other examples, the lamp is encoded as the FIGURE being in an 'above' relation to the GROUND, i.e., the table. In (10a), the Dene construer aligned the FIGURE with respect to his/her body as an anchor. The FIGURE is not only above the horizontal GROUND, but also 'up' there. This expression indicates the instantiation of a speaker-dependent vector specifying the vantage point. In the Totonac expression in (10f), a degree of specificity with respect to the distance between lamp and the ceiling (house) is expressed. The table is not mentioned as the reference point. In (10b-d) as opposed to (10e-f), the use of the verbs with the meaning 'hang' specifies the position of the FIGURE. In (10b), this is emphasized by the additional use of the prefix *na-* here probably meaning 'down from up'.



Schema 9: Representation of FIGURE/GROUND reversal

Schema 9 shows the FIGURE/GROUND reversal as given in the Dene expression in (10a): The larger object, i.e., the table, is the FIGURE or the profiled entity in an 'under' relation to the smaller one, the lamp. Schema 10 below presents the Totonac result in which the lamp is related to the ceiling/house.



Schema 10: Representation of different FIGURE/GROUND encoding in Totonac

Finally, Schema 11 presents the European speakers behavior in which the lamp is related above the table.

Schema 11: Representation of FIGURE 'above' the GROUND

In Schema 11, the FIGURE is the lamp. It is aligned to the larger GROUND, i.e., the table, in an 'above'-relation.

In all the examples except (10a), the FIGURE is located as being above the GROUND in a certain distance without being in contact (as opposed to, e.g., 'on'-relations); in (10a), there is also a distance between FIGURE and GROUND, but the FIGURE/GROUND relation is reversed. Still, the general idea is a spatial relation where a specific distance is assumed between the FIGURE and the GROUND in a non-attached relation and in a limited scope. The cohort profiles that the FIGURE is without contact to the GROUND and refers to a canonical knowledge of the scope in that particular spatial frame.

The next section presents inferior relations of the FIGURE to the GROUND.

3.4.5. FIGURE Inferior to/Enclosed by GROUND

The next example presents two interesting cases in Dene as opposed to the examples given in the European languages. Once again, there is a FIGURE-GROUND reversal in (11b+c); in the expression given by a Dene speaker in (11c), a dynamic process is encoded in addition to this revered relation.

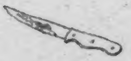


Figure 9: BUTTER ON KNIFE
Prompt: *Where is the butter?*

(11) a. GND LOC FIG POST=STAT[FIG] — Dene
bes k'e tłes the-tł'é
knife on greasy.substance IMPF.3sg.S- MM.handle.controlled(exist/lie)
'The butter is on the knife.'

b. FIG GND LOC POST=DYN[FIG] — Dene
bes tłes yaghe he-ʔa
knife greasy.substance under IMPF.3sg.S- SO.handle(exist/lie)
'The knife is covered by the butter (= knife under butter).'[39]

c. FIG GND LOC POST+LOC =DYN[FIG] — Dene
beschok tłes yaghe he-ł-tth'er
sword/knife greasy.substance under IMPF.3sg.S-CL- SO.handle.controlled(fall into)
'The knife falls into the butter' (= knife is covered by butter).'

d. FIG EXIST LOC GND — German
Die Butter ist auf dem Messer.
the butter 3sg.S.IMPF.be on the knife
'The butter is on the knife.'

e. FIG EXIST LOC GND — Norwegian
Smør-et er på kniv-en.
butter-the 3sg.S.IMPF.be on knife-the
'The butter is on the knife.'

f. FIG EXIST LOC GND — English
The butter is on the knife.
the butter 3sg.S.IMPF.be on the knife
'The butter is on the knife.'

g. BP+LOC[=DOS] FIG GND — Totonac
lakapi:xwaká'lh kuchílu tzamá: mantequilla
laka-pi:x-waká'lh kuchílu tzamá: mantequilla
face-neck-be.high knife that butter
'The butter is up on the flat edge of the knife.'

The Dene expression in (11a) encodes a static topological relation between the FIGURE and the GROUND that is consistent with the expressions used by English, Norwegian, German as well as Totonac speakers, i.e., the greasy substance of the butter is located 'on' the solid surface of the knife. In Dene, this relation is profiled by a postposition and an existence marker. The FIGURE is in a static relation to and supported by the horizontal

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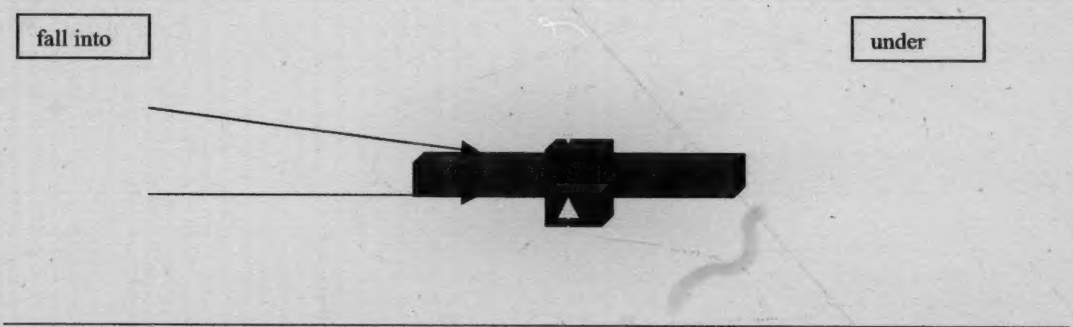
[39] The prefix *he–* (3PL./DL.) encodes modality and inceptive information. It requires the momentaneous stem.

GROUND. As opposed to this, the FIGURE/GROUND relation in (11b-c) is reversed. The greasy substance—'butter'—is now the prominent reference point in the speaker's perspective as opposed to the larger and hence more prototypical background. In addition, the cohort implies that the FIGURE—here being the knife and not the butter—is inseparably related to the GROUND, i.e., there is an occlusion or a containment-by-encircling-GROUND relation (Pederson et al. 1998). The substance of the FIGURE matters in this occlusion relation encoded in the Dene expressions. Moreover, a rather dynamic process in encoded here, as encoded by the dynamic verb stem used, meaning 'fall (into)'.



Schema 12: Representation of dynamic FIGURE 'under'/'in(to)' horizontal GROUND (11b+c)

Schema 12 captures the FIGURE/GROUND reversal that is at work in (11b-c), i.e., not the potentially smaller object, i.e., the substance butter, is the FIGURE, but the knife is. The blue arrows indicate the motion event that is profiled in (11c). The yellow arrows present the implied dynamic trajectory of the FIGURE becoming occluded or covered by the GROUND by 'falling into' it.

As opposed to the Dene examples in (11b-c), in (11d-g) a static topological relation is profiled. The FIGURE is in an 'on'-relation to the GROUND, i.e., the GROUND supports the FIGURE from below. It is the general reference point and limits its scope. A certain degree of specificity is profiled in the Totonac example in (11g) that expresses the exact location of the FIGURE on the GROUND.

In the examples given so far, there have been cases in which the contextualization of certain FIGURE/GROUND asymmetries has resulted in a dynamic encoding, e.g., in the case of 'butter on knife' or 'arrow in apple'. In these examples, the cohort conflates the general location and the direction of the FIGURE. The adposition, if used at all, bears temporal implications in addition to its locative function. I have presented examples that profile a wide range of spatial and temporal processes (see for the latter Brée & Pratt-Hartmann 2002). The parallel process of temporal and spatial meaning can be regarded as a process that instantiates a speaker-dependent domain. I call this domain the *entrenched spatial matrix* adopted from Langacker's stage model (Langacker 1987). This matrix includes, among other things, a vectorial entrenchment profiled via deictic markers. The entrenchment means that the speaker sets the stage for the actual scene. This setting depends on temporal and spatial features and the various possible object specifications, as described earlier with the imaging features.

3.5. Dynamic FIGURE/GROUND Relations: Causation

The dynamic FIGURE/GROUND relations in the following examples profile not only a motion event, but in some cases also the agent or causer of the motion. In the following examples in (12), Dene speakers encode the FIGURE's general motion, and in addition the causation of that motion is lexicalized within the verb stem 'float'.

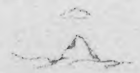


Figure 10: CLOUD OVER MOUNTAIN
Prompt: *Where is the cloud?*

(12) a.

GND	LOC	FIG	POST=DYN[FIG]	Dene
ttheshéth	*tethe*	*yak'odh*	*hu-tłį*	
rock.hill	above/over[40]	cloud	IMPF.3sg.S-AM.uncontrolled.motion	

‘The cloud moves (uncontrolled) above/over the mountain.’[41]

b.

GND	LOC	FIG	VFM=DYN[FIG]	Dene
ttheshéth	*daghe*	*yak'odhaz*	*ghe-shesł*	
rock.hill	above/over	cloud	IMPF.3sg.S-FO.float.uncontrolled (blown by the wind)	

‘The cloud floats (uncontrolled) above the mountain (moved by air).’[42]

c.

	FIG	EXIST		LOC		GND	German
Die	*Wolke*	*ist/befindet*	*sich*	*über*	*dem*	*Berg.*	
the	cloud	3sg.S.IMPF.be/located	itself	above	the	mountain	

‘The cloud is (located) above the mountain.’

d.

FIG	EXIST	LOC	GND	Norwegian
Sky-en	*er*	*over*	*fjell-et.*	
cloud-the	3sg.S.IMPF.be	above	mountain-the	

‘The cloud is above the mountain.’

e.

	FIG	EXIST	LOC		GND	English
The	*cloud*	*is*	*above*	*the*	*mountain.*	
the	cloud	3sg.S.IMPF.be	above	the	mountain	

‘The cloud is above the mountain.’

f.

LOC[DOS]	FIG	LOC[DOS]	Totonac
talhmá:n	*po'hlhnú'*	*waká'lh*	
ta:lhmá:n	po'hlhnú'	waká'lh	
high.above	cloud	be.high	

‘The cloud is up high above.’

g

BP+LOC[=DOS]	LOC	FIG	GND+LOC[=DOS]	Totonac
lakatzunajtzá	*waka'lh*	*ixpu:hélhni'*	*naksipéj*	
laka-tzunaj=tzá	waká'lh	ix-pu:-hélh-ni'	nak=sipéj	
faceclose=now	be.high	3PO-CTD-mouth-NM	LOC=hill	

‘The cloud is closely at the mouth of the hill.’

The two Dene examples in (12a-b) present a motion of the FIGURE in an uncontrolled manner. All elder speakers encoded such a dynamic pattern. In (a) the FIGURE is encoded as moving by the verb stem and the particle *hu*-, the FIGURE is therefore not in a static, but in a dynamic 'above'-relation to the GROUND. The causer of the movement, i.e., the wind, is only implied here. The semantic value of the causer, the initial physical force driving the motion, is a displacement feature in the motion event. In (12b), a "partially controlled action" is profiled (S. Rice 1997: 103). Here the cohort profiles the wind causing the motion of the FIGURE. Example (12a) does not profile the agent as opposed to (12b), but in both cases, it is not only the relation between FIGURE and GROUND that is at issue, but the motion event of the FIGURE as well.

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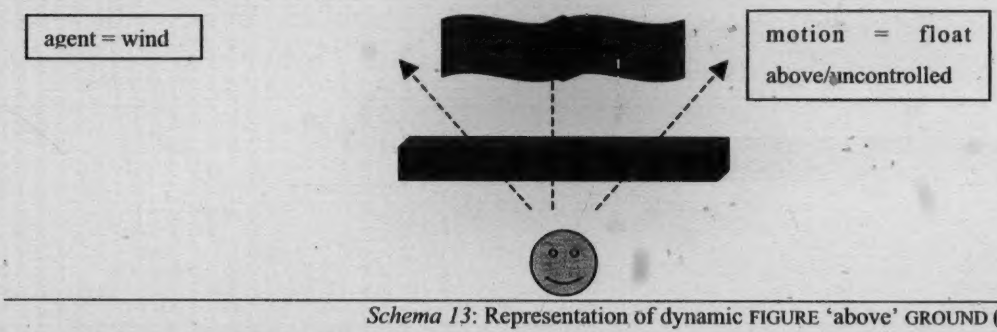
[40] Both *tethe* and *daghe* mean ‘above’ or ‘over’, but the latter can only be used in combination with a noun, i.e., it has the literal meaning that ‘over’ has in English.

[41] The prefix *hu-* means also third dual subject, and can be an optative prefix. It has also a spatial quality as in ‘pointing at’, ‘towards’.

[42] The prefix *ghe-* encodes a horizontal motion, and is an aspectual marker (perfective). Some related stems are-**shuł** ‘blow it’ (once); other related verb stems are the conjugated-**shał, -shál, -shał, -shił** = ‘to be blown (by the wind)’.

In the elicitation session I asked the Dene speakers specifically whether they could locate the FIGURE as being in a static relation to the GROUND. The Dene speakers argued that the FIGURE cannot be a non-moving static entity in a position aligned above the GROUND, i.e., both objects are not vertically aligned—'in sphere of'. They did not accept the idea of a static topological relation of the FIGURE being above the GROUND and claimed that this would be an unnatural or idealized description of the displayed event.

The expressions in (12a-b) encode a movement (implicitly or explicitly referring to the causer or agent) indicating that there is a space-time frame. The spatial relation in this is rather secondary. Schema 13 presents this FIGURE/GROUND alignment.



Schema 13: Representation of dynamic FIGURE 'above' GROUND (12a+b)

Schema 13 shows the above-mentioned relation with no contact between the FIGURE and the GROUND. The FIGURE is vertically aligned to the GROUND. In addition, the blue arrow profiles the uncontrolled motion event of the FIGURE.

As opposed to the examples given above, in (12c-e) the FIGURE is profiled as being in an unattached 'above'-relation to the GROUND, and no motion is expressed. Copular or existential verbs are used here to encode the FIGURE/GROUND assymetry. The

Totonac examples in (12f+g) also specify the distance of the FIGURE to the GROUND as being high or close respectively, but there still is enough distance to express an 'above' notion. However, the body part system in (12g) implies that the FIGURE is a very close position to the top of the hill. In (12f), the GROUND (i.e., the mountain) is left or only inferred, only the location of the cloud as high above is expressed.

Schema 14: Representation of FIGURE in static 'above'-relation to GROUND

The absence of the blue arrows indicating motion as in Schema 13 is the major difference between Schema 13 and Schema 14. The FIGURE is aligned to the GROUND in a static topological relation.

The next example in this section also presents several different construction type patterns of one scene.

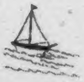


Figure 11: BOAT ON WATER
Prompt: *Where is the boat?*

(13) a.

FIG	VFM=DYN[FIG]	Dene
ts'i	*ghe-ɬ-út*	
boat	IMPF.3sg.S-CL-SO.raft (being.on.water)	

'The boat rafts (on water).'[43]

b.

FIG	LOC+GRD	POST=DYN/STAT[FIG]	Dene
ts'i	*tusį́*	*the-tą*	
boat	into.water	IMPF.3sg.S-SO.exist/lie	

'The boat is/lies in the water.'

---

[43] Another related paradigm is the expression *kón naregheɬút*: third singular subject is rafting (floating wood).

c.	FIG	GND	VFM=DYN[FIG]	Dene
	ts'injbale	*t'ats'i*	*ghe-shił*	
	sail	because.of.boat	IMPF.3sg.S-SO.uncontrolled.float (because.of.air)[44]	

'The sailing boat floats because of the wind (wind causing the motion).'[45]

d.	FIG	LOC	VFM=DYN[FIG]	Dene
	ts'njbalits'i	*k'e*	*ghe-shił*	
	boats.sail	on	IMPF.3sg.S-SO.uncontrolled.float(because.of.air)	

'The sailing boat floats (on) by the wind.'

e.		FIG	EXIST	LOC		GND	German
	Das	*Boot*	*ist*	*auf*	*dem*	*Wasser.*	
	the	boat	3sg.S.IMPF.be	on	the	water	

'The boat is on the water.'

f.	FIG	EXIST	LOC	GND	Norwegian
	båt-en	*er*	*på*	*vann-et.*	
	boat-the	3sg.S.IMPF.be	on	water-the	

'The boat is on the water.'

g.		FIG	EXIST	LOC		GND	English
	The	*boat*	*is*	*in/on*	*the*	*water.*	
	the	boat	3sg.S.IMPF.be	in/on	the	water	

'The boat is in/on the water.'

h.	FIG	POST	LOC+GND	Totonac
	párku	*wi:lh*	*nakxká:n*	
	párku	wi:lh	nak=xká:n	
	boat	sit	LOC=water	

'The boat is/sits on the water'

i.	LOC+BP	GND	MOV+FIG		Totonac
	naxhélhni'	*xka:n*	*a'ma:lh*	*pu:takítni'*	
	nak=ix-hélh-ni'	xka:n	a'-má:lh	pu:takítni'	
	LOC=3PO-mouth-NM	water	go-PRG	boat	

'The boat goes on the water.'

j.	FIG	LOC+BP+MOV	LOC+BP	GND	Totonac
	barco	*helha'má:lh*	*naxhélhni'*	*xká:n*	
	barco	helh-a'n-má:lh	nak=ix-hélh-ni'	xka:n	
	boat	mouth-go+PRG	LOC=3PO-mouth-NM	water	

'The boat is going on the water.'

In the Dene examples (13a-d), the FIGURE is not only encoded as being on or supported by the GROUND, but its movement is profiled as well by the verb stem. In (a), (c) and (d), the GROUND is inferred since to raft or to float here implies that the FIGURE moves on or in water. This means that the topological relation between FIGURE and GROUND is onlys implied, but not lexicalized as in the English transitive construction 'the boat is on the water' or the German *das Boot ist auf dem Wasser*. The example in (b), however, does locate the primary object as being in the GROUND. The postposition encodes the specific location of the FIGURE. As opposed to (a), the relation of the FIGURE to the GROUND is expressed by the use of a posture verb stem. However, the locative in (b) expresses rather a temporal or an inchoative motion event. The examples (c) and (d), on the other hand, encode not only a motion, but even the causation of the motion event—the wind.

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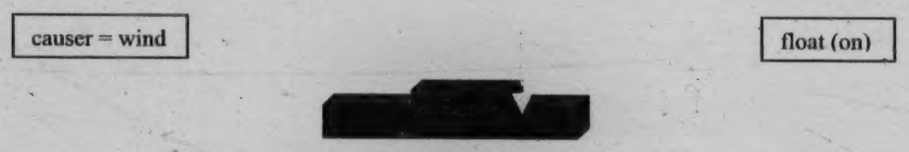
[44] The stem also encodes an inchoative event in addition to the perfective and telic event.

[45] Another related paradigm is *ghelеł* which roughly means 'He is floating'.



Schema 15: Representation of dynamic FIGURE/GROUND relation (13a, c+d)

Schema 15 indicates the FIGURE's motion as being caused by an external agent, here the wind. The relation is dynamic instead of static. This is presented by the blue arrow.

These examples show that Dene speakers, when asked to describe the location of the FIGURE, explicitly lexicalize a spatial-temporal event via the cohort system, i.e., they explicitly describe a rafting or floating event caused by air. In contrast to this, English, Norwegian, or German speakers (13e,f,g) infer this knowledge in their encoding of the scene. A default spatial relation is given, assuming that the FIGURE—the boat—is typically moving on a liquid surface. This information is apparently not necessary or important for an English, Norwegian or German speaker. S/he is likely to idealize the FIGURE/GROUND asymmetry as a static relation between FIGURE and GROUND by using a copular verb and a locative. In contrast, two of the given Totonac examples (13i,j), encode a movement by using a dynamic verb.

Schema 16 shows the static alignment between the FIGURE and the GROUND as expressed by the German, Norwegian, an English speakers.

Schema 16: Representation of FIGURE in static 'on'/'in'-relation to GROUND (13e, f+g)

This section presented the contextualization of certain supposedly static spatial situations as dynamic events. Topological 'on'-relations are explicitly given or implicitly refered to in all of the examples. However, in (13a), the motion event is predominant, whereas in (13c,d), it is the movement and its causer that is predominantly profiled.

This section indicated how presumably static and topological relations are encoded as primarily dynamic motion events. The idealization of the scene in locating the FIGURE on/in the GROUND does not refer to the inherent or 'natural' motion feature of the FIGURE in relation to the (liquid) GROUND. This information is relevant for the Dene speakers and the static scene is therefore contextualized and encoded as a dynamic event and by that as a temporal process being atelic and in an uncontrolled manner. Furthermore, many non-linguistic factors are expressed overtly by the Dene speakers, like the causation of the motion.

3.6 Projective FIGURE/GROUND Relations

This section provides several different projective relations. They include various frames of reference that speakers instantiate. In all cases of the first set of Dene examples below, the orientation is contextualized in terms of the actual modified perspective dependent on the focal point of the speaker. I expected that speakers would describe the boy as hiding (behind the chair) meaning that the girl is not really necessary to orient the FIGURE. Hence, such result is a non-contextalized response as opposed to the Dene examples below.

The following set presents a scene in which there are two possible reference points. The drawing in Figure 12 presents the FIGURE hiding behind the GROUND. The Dene example in (14b) encodes not only what is called the posterior location of the FIGURE hiding behind the GROUND, but also refers to a secondary GROUND, i.e., the girl in the presented scene.

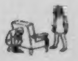


Figure 12: BOY BEHIND THE CHAIR
Prompt: *Where is the boy?*

(14) a.	GND	LOC	FIG	POST=STAT[FIG]			Dene
	edáchené	*tazį*	*deneuaz*	*e-he-ƛ-ʔį́*			
	chair	behind	boy	[?]IMPF-3sg.S-CL-AO.hide			

‘The boy hides behind the chair.’[46]

b.	GND$_1$	LOC	GND$_2$	LOC	POST=STAT[FIG]	Dene
	edáchené	*ʔuzį*	*tsekwaz*	*bech'azį́*	*e-he-ƛ-ʔį́*	
	chair	on.the.other.side	little.girl	him/her.away.from	[?]IMPF.3sg.S-CL-AO.hide[47]	

‘The boy hides behind the chair away from the girl.’

c.		FIG			LOC		GND	German
	Der	*Junge*	*versteckt*	*sich*	*hinter*	*dem*	*Stuhl.*	
	the	boy	3sg.S.IMPF.hide	himself	behind	the	chair	

‘The boy hides behind the chair.’

d.	FIG			LOC	GND	Norwegian
	Gutt-en	*gjemmer*	*seg*	*bak*	*stol-en.*	
	boy-the	3sg.S.IMPF.hide	himself	behind	chair-the	

‘The boy hides himself behind the chair.’

e.		FIG	EXIST		LOC		GND	English
	The	*boy*	*is*	*hiding*	*behind*	*the*	*chair.*	
	the	boy	3sg.S.IMPF.be	3sg.S.PRG.hide	behind	the	chair	

‘The boy is hiding behind the chair.’

f.	FIG	LOC	BP+LOC	LOC+GND	Totonac
	hawácha	*tatza'hní:'*	*xcha:hé:n*	*naksillón*	
	hawácha'	ta-tza'h-ní:'	x-cha:hé:-n	nak=sillón	
	boy	inch-hidden-PRF	3PO-back-NM	LOC=arm.chair	

‘The boy has hidden behind the chair.’

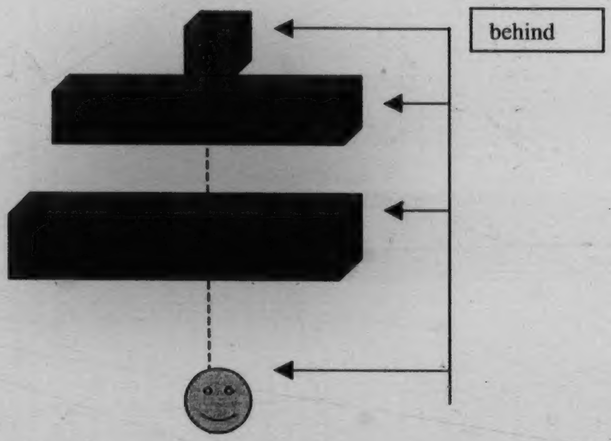
This Dene example in (14b) encodes the directional action of the FIGURE moving away from the secondary GROUND on the opposite side of the primary GROUND, not only the ‘behind’-relation of the FIGURE, i.e., the boy, to the GROUND, i.e., the chair. The spatial and temporal information is carved up in a detailed way and gives information that is usually inferred by English, Norwegian or German speakers.

In (14b), the different participants of the scene are encoded. The distinction between the FIGURE and one reference object is not sufficient. Talmy describes such additional semantic information necessary in terms of two categories: reference objects encompassing the primary reference object and those outside of the object (Talmy 1983:245). The main semantic function of such additional reference objects lies in giving the exact location of the FIGURE or a higher degree of specificity (Svorou 1994).

---

[46] See also the related paradigm *dátiłgiłʔį́* ‘We (pl.) hide (it).’ The prefix *he-* bears inceptive meaning.

[47] The morheme *e-* can express semelfactive, but I am not certain what exactly the meaning is here.



Purple Arrows: Construer/FIGURE/GROUND$_1$ +$_2$ hierarchy/alignment

Schema 17: Representation of projective FIGURE/GROUND asymmetry

Schema 17 presents the instantiation of the two possible reference points being the chair and the girl. Depending on the scope, the construer can choose between the two to profile a relative frame of reference. The Dene speakers in (14b) instantiated the chair as the anchor point of reference—'hiding behind the chair' specifies the SCOPE. This expression depends on the speaker's focal point and the scope to be profiled. The body-part system in Totonac forces the speaker to specify the GROUND's exact orientation to provide the scope for the FIGURE.

The example in (15) at first sight indicates an anterior location of the tree in relation to the church.

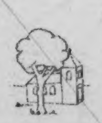


Figure 13: TREE IN FRONT OF CHURCH
Prompt: *Where is the tree?*

(15) a. Dene

FIG	LOC	GND	POST=STAT[FIG]
k'es	*gáh*	*yałtikóę*	*ho-ʔą*
poplar	close/near/beside	church	IMPF.3sg.S-SO.stand(exist)[48]

'The poplar stands beside the church.'

b. Dene

FIG	LOC	GND	[?]POST=STAT[FIG]
k'es	*ʔuzį*	*yaltikóę*	*ná-ghę-ʔą*
poplar	on.the.other.side.of	church	in.place.of[?]-IMPF.3sg.S-SO.stand(exist)

'The poplar stands on the other side of the church.'

c. Dene

GND	LOC	FIG	[?]POST=STAT[FIG]
lałéskóę	*k'edhe*	*k'es*	*ná-ghį-ʔą*
church	alongside	poplar	in.place.of[?]:IMPF.3sg.S-SO.stand(exist)

'The poplar stands alongside of the church.'

d. Dene

GND	LOC	FIG	[?]POST=STAT[FIG]
yałtikóé	*gháłk'edhé*	*k'es*	*ná-ghį-ʔą*
church	close/near/beside/alongside	poplar	in.place.of[?].IMPF.3sg.S-SO.stand(exist)

'The tree stands close/near/beside/alongside of the church.'

e. German

	FIG	POST	LOC		GND
Der	*Baum*	*steht*	*vor*	*der*	*Kirche.*
the	tree	3sg.S.IMPF.stand	in.front.of	the	church

'The tree stands in front of the church.'

f. Norwegian

FIG	POST	LOC	GND
Tre-et	*står*	*foran*	*kirk-en.*
tree-the	3sg.S.IMPF.stand	in.front.of	church-the

'The tree stands in front of the church.'

g. English

	FIG	EXIST	LOC		GND
The	*tree*	*is*	*in front of*	*the*	*church.*
the	tree	3sg.S.IMPF.be	in front of	the	church

'The tree is in front of the church.'

h. Totonac

LOC+BP	GND	POST	CLS	FIG
ixcha:hé:n	*nakpu:sikwalán*	*ya:lh*	*a'hatín*	*kí'wi'*
ix-cha:hé:-n	nak=pu:sikwalán	ya:lh	a'ha-tín	kí'wi'
3PO-back-NM	LOC=church	stand	CLS-one	tree

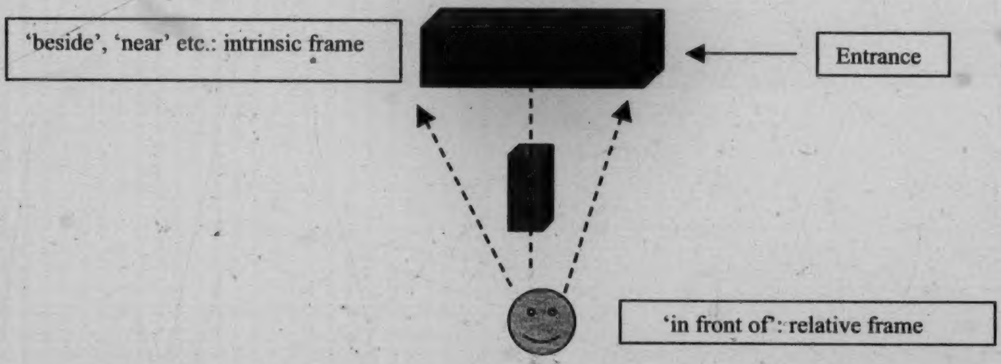
'There is a tree behind the church.'

---

[48] The prefix *ho-* also encodes an area or a place (Cook 2004: 174). This prefix remains ambivalent in its exact meaning, as Cook points out.

The results in (15a-c, possibly also d) indicate the speaker's use of a particular kind of contextualized intrinsic frame of reference (Levinson 2003). It does not encode an 'in front of' (which would be *nadaghe* in Dene) relation of the primary to the secondary object as we see in the English, Norwegian and German examples (15e-g) that use a relative frame of reference (the human body or viewer's location being the anchor for orientation). The Dene speakers rather encode a FIGURE-dependent construal in which the entrance of the church is profiled as the intrinsic focal point in the encoding of the relation of the FIGURE to the GROUND.

An intrinsic frame of reference expresses more specifically the FIGURE's orientation. Such expressions are generally called non-biased geometry as opposed to a biased geometry (Talmy 1983: 240). In expressions based on a biased geometry, a relative frame of reference is instantiated that depends on the speaker's perspective of the scene. In other words, the speaker profiles the FIGURE as being in a frontal axis to the GROUND depending on the speaker's perspective.


'beside', 'near' etc.: intrinsic frame
Entrance
'in front of': relative frame

Schema 18: Representation of projective FIGURE/GROUND asymmetry (15a-g)

Schema 18 presents the various profiled spatial projective relations in (15a-g). The scene depends on the construer's perspective, i.e., there is either a 'beside' or 'in front of' relation of the FIGURE to the GROUND. If a speaker uses the adposition 'beside' or an adposition that has a similar meaning, then the frame of reference is an intrinsic one with regard to the GROUND, profiling object-inherent features—the entrance—of the church as the anchorage. Any 'in front of' relation, on the other hand, depends on the relative frame of reference, i.e., the viewer's perspective is at stake. The latter is the case in examples (15e-g). Here, the FIGURE/GROUND asymmetry is profiled via the relative frame of reference: Tthe speaker instantiates a frontal axis between his/her perspective (human body as the anchorage point) and the two objects displayed in the scene. Totonac speakers (15h), on the other hand, use an intrinsic frame of reference as well, but a different one than the Dene speakers in (15a-b): For them, the tree is 'behind' the church, expressed by the use of the body-part system.

In the next scene given below, the FIGURE is also in a lateral position to the GROUND. The FIGURE is placed beside or—from my German perspective—to the left of the fire.

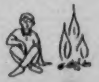


Figure 14: BOY NEXT TO FIRE
Prompt: *Where is the boy?*

(16) a. GND LOC POST[FIG] — Dene
kón gah the-da
fire(outside) close/near/beside IMPF.3sg.S-AO.sit
'The boy sits next to the fire.'

b. FIG GND LOC POST[FIG] — Dene
chelekwaz kón nih the-da
young.man fire(outside) light/warmth.of IMPF.3sg.S-AO.sit
'The boy sits in the light (in a certain distance to) of the fire.'

c. FIG POST LOC GND — German
Der Junge sitzt neben dem Feuer.
the boy 3sg.S.IMPF.sit beside the fire
'The boy sits beside the fire.'

d. FIG POST LOC GND — Norwegian
Gutt-en sitter ved siden av fyr-en.
boy-the 3sg.S.IMPF.sit at side of fire-the
'The boy sits beside the fire.'

e. FIG EXIST LOC GND — English
The boy is beside the fire.
the boy 3sg.S.IMPF.be beside the fire
'The boy is beside the fire.'

f.	LOC+BP	LOC+GRD	EXIST	FIG	Totonac
	naixlakatzunaj	*nakmakskút*	*la:-wí:lh*	*hawácha*	
	nak=ix-laka-tzunáj	nak=makskút	la:-wílh	hawácha'	
	LOC=3PO-face-little	LOC=flame	3sgS.IMPF:do-sit/be	boy	

'The boy is near the fire'

The Dene data indicate that the animate FIGURE, i.e., the boy, is situated in a lateral or proximity locational relation to the GROUND, i.e., the fire. This is expressed by the basic positional verb stem *–da*, profiling the general orientation, plus prefix and a locative as the major parameters in this cohort system. The most interesting example here is (16b), in which an exact positioning is specified by means of referring to the GROUND's physical qualities: the fire shedding light and warmth. Sitting in the light or warmth of a fire implies that someone sits in the close vicinity of it. This degree of specificity is not expressed in the following examples depending of the GROUND's characteristics.

In nearly all the other examples, the FIGURE is placed beside the GROUND. The viewer instantiates a lateral axis between her/himself and the object to be located in a relative frame of reference. The GROUND serves as the reference point to locate the FIGURE as being 'beside it'.[49] Speakers impose a spatial matrix that serves as the anchorage in limiting the scope to a relation where FIGURE and GROUND are in the visual vicinity of each other. The only exception is the Totonac example, which expresses a relation of proximity via the body-part system. Instead of 'sitting (beside) the fire', 'the boy here sits 'near' it'. In other words, here we find an intrinsic rather than relative frame of reference.

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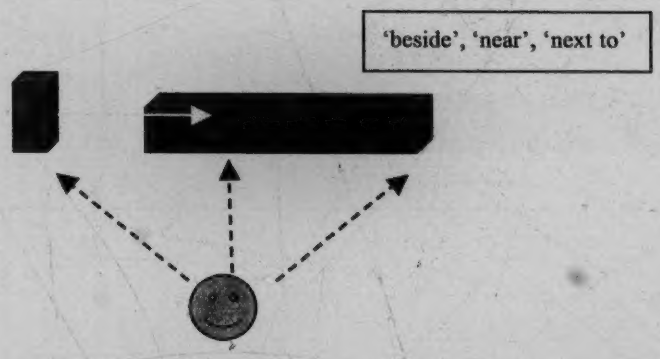
[49] However, some Dene speakers encoded the FIGURE as being on the right side of the GROUND, thereby instantiating an intrinsic frame of reference, not a relative one depending on the speaker's viewpoint.



Schema 19: Representation of projective FIGURE/GROUND asymmetry

The encoding processes in nearly all the languages as exemplified by Schema 19 express the projective relation anchored to the human body, i.e., a relative frame of reference is instantiated. The viewer profiles a lateral axis between his/her vantage point and the GROUND, i.e., the fire. After this alignment the viewer is able to relate the FIGURE with respect to the GROUND. The coordinate system enables to set a relative frame of reference.

3.7. General Discussion

This chapter surveyed the range of spatio-temporal encoding patterns present in the languages under study. Even typologically close languages such as German, English, and Norwegian manifest subtle differences in the expression of topological spatial relations, not to mention the larger differences evident between them and Dene or Totonac. In my view, these differences are indications of language-specific, if not construction-specific, systems for encoding spatial relations. Moreover, these systems rely on the speaker's world knowledge in his/her entrenched orientation based on particular mental models (Dutke 1994; Emmory & Fromkin 1988; Harras 1995). I claim that this matrix depends on language-specific affordances that go beyond purely topological information based on geometry. This addition of an orientational bias tends to capture the general location of the participants in the various frames of reference.

The languages under survey differ in terms of the semantic diversity and the subjectivity of their spatial encoding systems. Dene (and to a lesser degree also Totonac) is far more descriptive than the more abstract and objective spatial encoding systems of the European languages represented here. In addition, Dene speakers tend to encode their specific perspective by means of a deictic expression. I interpret such expressions as subjective instantiations in the FIGURE/GROUND asymmetries as opposed to qualities that are characterized as being objective or externally given qualities.

The examples given above also show differences in the description of FIGURE/GROUND relations as manifested in the distribution of static-dynamic encoding patterns. I use the term dynamic with respect to the FIGURE's trajectory being encoded via a motion cohort versus a static relation. The latter expresses the FIGURE/GROUND asymmetry via a static verb system and a locative marker. In a dynamic encoding strategy, the self-propelled or caused motion of the FIGURE is profiled and enters into the description. In a 'purely' spatial and static encoding, the most semantically neutral type of verb, i.e., a copula verb inflected in a simple present tense is used. For example, the locative 'through' in addition to the verb 'to shoot' has been assessed as profiling a dynamic motion event, implying that the FIGURE is somehow related to the GROUND via a locative, but this resulting spatial relation may only be secondary to the dynamic event by which the FIGURE and GROUND come to be related spatially in the first place. In addition, the regular inclusion of temporal information, at least by Dene speakers, suggests that topological relations are not that basic or even readily apparent, and if they are, they are by no means speaker-neutral nor necessarily derivable from physical or topological features of the objects being related.

In Dene and Totonac, the various expressions are dominated by the encoding of the degree of specificity and rather contextualized construal patterns. Moreover, Dene speakers reverse the FIGURE and GROUND elements in some of the examples. Therefore, I assume that a 'natural' background does not necessarily emerge to serve as an objectively given reference point. In addition, Dene speakers also frequently leave out any explicit mention of the GROUND, whatever they take the GROUND to be.

In Dene, the drawings are often described based on the function of the FIGURE being located depending on its animacy, texture, material, and shape in relation to the GROUND. In addition, the GROUND imposes certain interpretations; for example, water as the GROUND for a boat implies that the FIGURE cannot exist statically in a location. Therefore, the drawings are described as contextualized situations. Contextualized indicates the influence of extra-linguistic and functional knowledge of the speaker's real world. This influence is mirrored in the various morphosyntactic paradigms a speaker can choose from or the various affordances that go into an utterance.

Again, situations such as 'a boat on water' or 'a cloud above a mountain' are frequently described by Dene speakers as involving objects which are moving or floating, i.e., as dynamic motion events. Moreover, the movements of these objects are described as being caused—in these cases by the wind. In such a scene, it is not a spatial or even topological relation that is being expressed through a stative verb and locative, but the expression of caused motion and, thus, a dynamic event that unfolds over time.

In English, Norwegian, or German, it is not necessary to specify that a bottle is standing in an upright position in relation to the horizontal GROUND. However, German speakers often select a verb from a rich posture verb inventory that does specify the specific orientation of the reference object—a bottle 'stands' on the table, whereas a cloth 'lies' on it. Only certain objects can stand, but the verb stem does not change because of specific inherent features of the FIGURE itself as in Dene, only if a different orientation is imposed as in 'the bottle lies on the table' (meaning that it is turned on its side).

As mentioned above, Dene speakers tend to encode 'spatial' relationships between FIGURE and GROUND objects through a cohort of morphosyntactic devices, including classificatory verbs, directional verb prefixes, and postpositions. If a locative marker is used, it only expresses generic spatial information about the FIGURE/GROUND relation. The nature and identity of the FIGURE is signaled through the classificatory verb stem plus a variety of tense/aspect, thematic, valency, and directional verb prefixes. Hence, the Dene verb system provides a variety of additional information about the FIGURE and its particular spatial alignment which is often regarded as secondary or incidental in the *TRM* study.

Spatial topological relations are not encoded on the basis of purely objective coordinates given by external and thus speaker-neutral spatial parameters. Instead, if spatial language is used in Dene, it is inclined to encode a rather perspectivized construal as opposed to a more static and objectivized one that is generally assumed for topological relations. And the same pattern, although to a lesser degree, holds also for the other languages being compared.

I have presented a description of selected spatial topological relations in Dene in comparison to a small set of other languages. Using the *Topological Relations Picture* elicitation instrument, the semantic scope of individual spatial devices has been determined. One initial and crucial result is that Dene and Totonac carve up spatial and temporal events differently from the Germanic languages.

Dene speakers do indeed use highly spatial language, but the focus in many cases is on the encoding of rather perspectivized construals as opposed to static and objectivized ones, as is prevalent in most European languages. The speakers' responses give a good indication of the considerable richness in the range of devices used to describe relations that were presumed by the MPI group to be static spatial relations between a FIGURE and GROUND object. In addition, the data support the hypothesis that, in Dene, speakers' descriptions of purportedly topological relations do not rely on locative devices exclusively. Indeed, space is often only a secondary aspect in the instantiation of the FIGURE/GROUND asymmetry and less important than temporal or more causal processes.

Moreover, with regard to Langacker's stage model (Langacker 1987) of widespread use in cognitive linguistics introduced in Chapter 2, various coordinates are instantiated to limit the scope of the FIGURE/GROUND asymmetry. This stage model implies that the scope of the FIGURE to be localized depends on various different qualities of the GROUND. The cohort systems have proven to encode a wide range of spatial and temporal parameters entrenched in a multidimensional matrix. The semantic information is spread throughout the utterance and includes inferred extra-linguistic knowledge. To a lesser degree, this is also the case in the other languages.

I have shown that it is necessary to link up linguistic and extra-linguistic factors and take account of their interplay, because it plays an important part in the construction of meaning in general and the conceptualization of spatial relations in particular (Bryant 1997; Canfield 1981). Current models of topological spatial relations propose a consistency across languages in terms of how objects of a scene are related, i.e., [illegible] is usually assumed that geometrical features trigger the relation. In using the *TRM* tool, the complex interplay between conceptual reasoning, language, culture, and contextual factors has been exemplified.

Pederson et al. (1998) suggest that spatial descriptions are often a good place to locate grammatical distinctions that are not strictly spatial in nature. This is indeed the case in Dene and, as it turns out, the "Where"-question proposed by Pederson et al. (1998) implies or even forces a topological spatial relation which does not necessarily make for a natural description of a scene for a Dene speaker. In the upcoming chapters, I will discuss the question whether there is a task effect or response bias to be found in the elicitated data.

Chapter Four

The Caused Position Task

4.1. Introduction

This chapter presents some results of my second study, the *Caused Position* task (henceforth *CP*). It is an additional test to the *TRM* study and varies from it in terms of the stimuli used and the visual presentation. In this task, the stimuli are depictions of real objects that in some cases are manipulated by people. The *CP* test is similar to the *TRM* in that it is designed to elicit locative descriptions. It is intended as a follow-up study to the *TRM* elicitation tool. Primarily, the *CP* task aims to exhaust the verbal elements used to express location as in 'sit', 'stand', and 'lie'. This is of particular interest for the present study, s[illegible] the *TRM* study shows the predominant encoding pattern of spatial relations using (+/–) locative + posture cohort systems in Dene. Hence, it seems only natural to ask for the specific quality of these systems.

Additionally, the initial test indicated that the general conception of spatial topological relations in Dene is often not purely static, but dynamic. It is thus of interest to study more specifically the correlation between the encoding of relations in which an object is in motion as opposed to a static relation.

The focus is now on the role of a potential external agent as well as on dynamism in the different usages of positional verbs in locative constructions (Hellwig & Lüpke 2001: 126). The *CP* test was developed to reveal the inception of relations between FIGURE and GROUNDS in 46 short video clips.

Primarily, the *CP* video stimulus set aims to exhaust the verbal elements used to express location in a language. Whether verbal elements change in the description of static versus more dynamic spatial scenes is of particular interest for the present study. The interest results from the *TRM* study which showed a predominant encoding pattern of locative plus posture verb cohort for the majority of the languages under study.

4.2. Method

4.2.1. Participants

Native speakers of Dene Sųłiné, solicited primarily from the Cold Lake First Nations Reserve in Alberta, Canada, served as paid language consultants for this project. A total of 7 speakers were interviewed (5 female, 2 male, aged ~ 55-85) at their convenience in Edmonton or in Cold Lake. The participants were bilingual speakers of English and Dene.

For comparative purposes, I asked 6 speakers of standard German (age ~ 30-61), 7 speakers of Canadian English (age ~ 24-45; 5 undergraduate students of linguistics, and 2 speakers not affiliated with linguistics and academia at all). I also asked four Norwegian speakers of standard Norwegian (Bokmål) (age ~ 24-35; under- and graduate students) to confirm the similarity to German and English as opposed to Dene (note that Swedish and Danish speakers showed consistent results across the various videos that were also similar to German and English). I have not included the Norwegian actual sentences, but present only the frequency counts. I have decided to do so since the Norwegian results are similar to the English ones.

4.2.2. Materials

Materials consisted of the 46 video clips as developed in Hellwig & Lüpke (2001). A number of different FIGURE/GROUND asymmetries are focused on in the *CP* test. There are two different categories indicating (a) an agent manipulating the FIGURE so that it changes its position and (b) situations in which the FIGURE appears without an agent causing its appearance. Table 9 presents the distribution of static versus dynamic qualities of the various scenes.

Table 9: Various +/– Agent Situations in the *CP* Tool

Total	46 Video Clips/FIG/GND Relations	
	30	+Agent = a person manipulates FIGURE X to be 'on', 'in', 'at' etc. the GROUND Y
	16	–Agent = no agent visible
↪	13	FIGURE appears dynamically
↪	3	FIGURE is at its place already

Table 9 indicates that from the 46 video clips, 30 present an agent manipulating the FIGURE's location, i.e., a transition and manipulation of the FIGURE is shown. This transition is usually accompanied by the verb 'to put'. The agent (mostly a woman) puts the FIGURE somewhere, i.e., on a table, in a bowl, on the ground, or at a tree. 16 clips indicate no manipulation by an agent, but a situation in which the FIGURE is somehow treated without an agent. More specifically, 13 situations present the FIGURE appearing out of the void. The question here is whether speakers express the agent and the transition of the FIGURE, and whether they express the sudden appearance. Table 10 presents the 46 different FIGURE/GROUND asymmetries.

Table 10: *CP* Inventory

FIG/GND Asymmetry	+/– Agent	FIG/GND Asymmetry	+/– Agent	FIG/GND Asymmetry	+/– Agent
1.FIG = Table Cloth; GND = Table	[A]	16.FIG = Bottle; GND = Tree/Earth	[A]	31.FIG = Cassava; GND = Tree/Branch	[A]
2.FIG = Rope; GND = Branch	[–A]	17.FIG = Ball; GND = Tree/Branch	[A]	32.FIG = Ball; GND = Tree	[–A]
3.FIG = Beans; GND = Table	[–A]	18.FIG = Pot; GND = Tree/Branch	[–A]	33.FIG = Pot; GND = Table	[A]
4.FIG = Two Balls; GND = Table	[A]	19.FIG = Rope; GND = Table	[A]	34.FIG = Pot; GND = Table	[–A]
5.FIG = Beans; GND = Table	[A]	20.FIG = Bottle; GND = Table	[A]	35.FIG = Cassava; GND = Table	[–A]
6.FIG = Rope; GND = Table	[–A]	21.FIG = Table Cloth; GND = Tree Branch	[–A]	36.FIG = Pot; GND = Table	[A]
7.FIG = Cassava; GND = Box	[A]	22.FIG = Bottle; Tree/Branch	[–A]	37.FIG = Cloth(folded); GND = Box	[A]
8.FIG = Pot, GND = Tree/Branches	[A]	23.FIG = Cassava; GND = Tree	[A]	38.FIG = Rope; GND = Branch	[A]
9.FIG = Beans in Bowl; = GND Table	[A]	24.FIG = Ladder; GND = Tree	[A]	39.FIG = cassava; GND = Table	[A]
10.FIG = 2 Bottles; GND = Table	[A]	25.FIG = Bottle; GND = Table	[–A]	40.FIG = Pot; GND = Table	[–A]
11.FIG = Ball; GND = Table	[–A]	26.FIG = Cassavas; GND = Table	[A]	41.FIG = Stick; GND = Ground	[A]
12.FIG = Cloth; GND = Table	[A]	27.FIG = Rope; GND = Box	[A]	42.FIG = Cloth; GND = Table	[–A]
13.FIG = Stick; GND = Tree/Earth	[A]	28.FIG = Bottle; GND = Table	[A]	43.FIG = Bottle; GND = Tree/Branch	[A]
14.FIG = Bottle; GND = Table	[A]	29.FIG = Cassava on Rope; GND = Branch	[A]	44.FIG = Stick; GND = Table	[–A]
15.FIG = Ball; GND = Table	[A]	30.FIG = Stick; GND = Table	[A]	45.FIG = Pot; GND = Table	[A]
				46.FIG = Ladder; GND = Ground	[A]

Number = Video clip; A = indicates an agent manipulating the FIGURE; –A means that no agent is present.

4.2.3. Design and Procedure

The participants were asked to describe the displayed scene, e.g., someone putting an object such as a ball, rope, or bottle of wine on a table, on the ground or at a tree. These are contrasted with video clips in which the object appears without showing the causer, e.g., a rope appears on a tree, a ball appears on a table. After each initial description, I asked the speakers for other possibilities to describe the scenes.

The data were either recorded on a mini-disc player or by the internal microphone of a Mac Power Book. In addition, pencil and paper notes were used. The results were proof-read and confirmed by the same native-speaking Dene consultant as the ones of the *TRM* study.

4.2.4. Results and Discussion

The test has revealed some interesting differences with respect to the *TRM* results. The *TRM* indicates that Dene and Totonac speakers encode most of the situations on a high level of specificity as opposed to the European speakers. German and English speakers, for example, reduced the information to a semantic minimum as opposed to Dene and Totonac speakers. In Dene especially, a dense cohort system was used to express the various situations. This cohort system was loaded with inferred extra-linguistic information.

The *CP* results are diametrically opposite. Speakers of Dene reduced the scenes to a minimum of semantic information. They did not encode the causer or manipulator, whereas German, English and Norwegian speakers did. Furthermore, no transition of the FIGURE was profiled, i.e., the agent manipulating the FIGURE's change of location. Dene speakers instead encoded the resultive state of the event.

It might be possible that the speakers did not express the manipulations because the question they were asked prompted the actual end result of the placement. Moreover, the context made much clearer what is being located with respect to a specific reference point. Note also that in some of the video clips, an object appears out of the blue, like a pot in a fork of a branch—a situation that was considered unnatural by the Dene speakers.

Table 11 shows the overall results of the various stems used in Dene. It should be noted here that most of the expressions elicited use a postposition: the all-purpose marker *k'e* 'on'. In nearly all of the instances, speakers used this locative marker to express an 'on'-relation, only when situations occur in which the FIGURE is oriented 'in' or 'in between', *ye* or *geze* are used. From 322 expressions in Dene (7 speakers times 46 video clips = 322), 259 (80.4 %) use *k'e* to instantiate the FIGURE being in an 'on'-relation to the GROUND. Only 56 use the locative *geze* (17.4 %) and 2.2 % of the utterance use other locatives than 'on' or in 'between' (it is the locative *gah* 'near', 'close', 'beside' that is used in these cases). I want to highlight once more here that the locative marker seems to have a morphosyntactic rather than a semantic function. Speakers regularly stated that the locative can be dropped and that the verb system alone gives sufficient information about the FIGURE's orientation to the GROUND. Diachronically, I do not know how the locative marker emerged, but it might refer to an influence of other languages rather than a genuine structure of Dene. The most stable and predominant structure and semantic information is carried within the verb system and the numerous prefixes that are scattered throughout morpheme boundaries.

The following cohort structure is the *CP*'s actual language-related result for Dene: FIG + LOC + GND + POST/CLV+FIG. As such, the cohort systems involve various participants, and their spatial and temporal instantiation are the two basic features that need to be instantiated in the asymmetry. Moreover, this formula presents the additional information that comes with the posture or classificatory verb stems in addition to a locative marker. The formula presents the most prominent profile pattern speakers assigned to the various situations in the video clips. Hence, the overall morphosyntactic structure is from left to right, the FIGURE followed by a facultative locative such as *k'e* and the GROUND. The verb stem and its prefixes contain predominantly posture or neuter verbs, i.e., classificatory verb stems. These stems and the additional prefixes encode temporal and spatial information of the FIGURE to be located with respect to the GROUND. Morphosyntactically, an SOV order is at work, only that the V also encodes the S's various qualities such as size, shape, animacy, scope etc.

Table 11 presents a summary of the FIGURE/GROUND relations encoded by Dene speakers and the various verb stems they used to express those relations.

Table 11: *CP* Frequency of and the Dene Verb Stem Distribution

GND[1]	Σ	GND %	Verb Stem Frequency[2]	Stem	Σ	%	FIG[3]	CLV	Σ	%
Table	182	56.5	SO situated	*-tą*	112	34.8	Bottle	SO	56	17.4
Tree/ Branch	105	32.6	RO.situated	*-ʔą*	63	19.6	Pot	RO	49	15.2
GROUND	14	4.4	PO.lie	*-la*	56	17.4	Yam	SO	49	15.2
Box	21	6.5	SO.poke	*-tthił*	42	13.0	Cloth	FO	35	10.9
	322	100	FO.situated	*-chúdh*	35	10.8	Ball	RO	35	10.9
			PO.situated	*-dzái*	14	4.4	Rope	FO	35	10.9
					322	100	Stick	SO	28	8.7
							Beans	PO	21	6.5
							Ladder	SO	14	4.3
									322	100
							POST[4]	SO	147	45.6
								RO	84	26.1
								FO	70	21.8
								PO	21	6.5
									322	100

[1] This column presents the overall number of used reference points in *CP*.
[2] This column summarizes the various used verb stems used by Dene speakers specifically.
[3] Summary of the overall number of FIGUREs used in Dene as displayed in *CP*.
[4] This is the overall summary of the respective CLV class, e.g., bottles, stick, ladder and yam are summarized as SO.

Four different GROUNDs are used throughout the 46 video clips, as well as 9 FIGUREs, e.g., bottle, pot, ball, yam (as also encoded by German, English, and Norwegian speakers). Most reference points are horizontally aligned to the earth, e.g., table or box, and only one is aligned vertically, i.e., tree. The most common verb stem is stick-like (45.6%), e.g., bottle, yam, stick, and ladder, followed by the round-like (26.1%), e.g., pot and ball, and the flexible one (21.8%), e.g., rope. Dene speakers encode the actual transition from object X to Y by a handling verb that expresses the manipulation of the FIGURE. In almost all cases it is the classificatory verb system that expresses the various spatial and temporal relations, whereas the usage of a locative marker seems more a morphosyntatic strategy than a necessity to encode FIGURE/GROUND asymmetries. Once again, I have constantly asked speakers about the locative marker, as I did in the *TRM* study, and they assured me that the locative marker *k'e* can be dropped. Hence, the spatial information is primarily carried by the verb cohort. Table 12 presents the results of the European speakers' responses.

Table 12: Posture Verbs Frequency Count in German, English, and Norwegian

German			English			Norwegian		
Speakers	6		Speakers	7		Speakers	4	
FIG +Posture Verb + LOC + GND	Σ	%	FIG +Posture Verb + LOC + GND	Σ	%	FIG +Posture Verb + LOC + GND	Σ	%
liegen ('to lie') + LOC	150	54.4	*to lie* + LOC	175	54.4	*å ligger* + LOC	100	54.4
stecken ('to stick/to put') + LOC	48	17.4	*to stick* + LOC	56	17.4	*å stikke* + LOC	32	17.4
hängen ('to hang') + LOC	18	6.5	*to hang* + LOC	21	6.5	*å henge* + LOC	12	6.5
stehen ('to stand') + LOC	24	8.7	*to stand* + LOC	28	8.7	*å stå* + LOC	16	8.7
stellen ('to put) + LOC	24	8.7	*to put* + LOC	28	8.7	*å legge* + LOC	16	8.7
lehnen ('to lean') + LOC	12	4.3	*to lean* + LOC	14	4.3	*å lene* + LOC	8	4.3
	276	100		322	100		184	100

All results are encoded as indicated in the first column, i.e., FIG + posture verb + LOC + GND cohorts. Additionally, the posture verbs are always followed by a locative marker.

The various posture verbs are similar across the three European languages.[50] The FIGURE precedes the posture verb followed by the locative and the GROUND. This is of course expected since all three language have a SVO order.

Table 13: Frequency Count of the Prepositions in German, English, and Norwegian

German	Speakers 6		English	Speakers 7		Norwegian	Speakers 4	
Preposition	Σ	%	Preposition	Σ	%	Preposition		%
auf 'on'	162	58.8	*on*	189	58.8	*på*	108	58.8
in 'in'	60	21.7	*in*	70	21.7	*i*	40	21.7
an 'at'	24	8.7	*at*	28	8.7	*på*	16	8.7
über 'over'/'above	18	6.5	*over/above*	21	6.5	*øver*	12	6.5
vor 'in front of'	12	4.3	*in front of*	14	4.3	*foran*	8	4.3
	276	100		322	100		184	100

The results of the use of prepositions in the European languages are consistent throughout the *CP* responses cross-linguistically. All of the 782 (276 + 322 + 184) utterances encode a spatial topological relation by a preposition, 'on' being the most frequent in all languages (just as was the case in Dene). This is of no surprise since most of the displayed FIGURE/GROUND relations are in fact static 'on'-relations. The semantics of locative markers and posture verbs varies greatly between languages. With respect to the *CP* results, the English and Norwegian results are practically identical. German speakers differ in their usage of posture verbs. Those verbs have a higher degree of specificity as opposed to existential usages only.

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[50] It is interesting to see the usage of posture verbs since those have not been used freqeuntly in the *TRM* task. It seems that when a causer is involved, the action is best described by a posture verb, not by an existential marker.

Another striking result is the total number of situations in which an actor directly manipulates the FIGURE. Of the 46 video clips, 32 include a causer, whereas 14 do not. There is no difference in the FIGURE/GROUND asymmetries between German, English, and Norwegian speakers. If an agent is visible, s/he is encoded, if a sudden appearance is presented, then all three European languages encode such a relation. All of the 32 situations presenting a manipulation are profiled.

Table 14 presents the total number of the *CP* FIGURE/GROUND asymmetries with regard to the agent/non-agent differentiation.

Table 14: +/– Agent Encoding Patterns in German, English, Norwegian, and Dene

Total: 46 Videos/test 32: +Agent 14: –Agent 13 = sudden appearance	24 Speakers = 11[illegible]4 (24x 46)		+Agent	–Agent
		Σ	768	336
		%	69.6	30.4
				'suddenly'
➤	German		69.6	30.4
➤	English		69.6	30.4
➤	Norwegian		69.6	30.4
➤	Dene		0	0

Table 14 presents 69.6% (the + agent column) of the utterances encoding the manipulation and transition of the FIGURE being placed somewhere by a causer or agent. Only 30% of the descriptions include mentioning of the sudden appearance of the FIGURE. The separate frequency account on the selected languages presents the coherent percentage for German, English, and Norwegian. Dene is different in that speakers did not express the sudden appearance or the agent.

In order to give a more comprehensive overview of the various encoding patterns, I present selected scenes depicting different FIGUREs in various relations to the GROUND.

As already mentioned, however, the 46 video clips present a very limited range of object variation. This is why I only picked a limited number of scenes for the discussion here. In this chapter, I will also not show images from the scenes presented to the participants for technical reasons.

4.3. *CP* Responses

I have subdivided the following sections presenting various FIGURE/GROUND patterns. Generally, I will present a particular object in relation to various GROUNDs, starting with the most 'common' FIGURE/GROUND relation. Hence, in this section, I present various verb stems used in Dene. The verb stems should by now be familiar from the previous section, since they were also used there to encode topological relations. In the different sections, I will also compare a number of the scenes in which an agent directly manipulates the FIGURE with a counterpart scene in which there is no causer or outside agent displayed. I contrast the Dene data with German, English, and Norwegian results for comparative purposes.

4.3.1. Flexible Object in Various Relations to GROUND

The following examples present a flexible FIGURE—a rope—appearing or being placed on a table, on a branch, or in a box that is on a table. A difference can be seen in the profiling of the various events, especially in the last scene that involves an actor, manipulating the FIGURE, i.e., putting the rope in a box on a table. In the first example, the rope suddenly appears on a table.

FIGURE = Rope; GROUND = Table (6) [–A][51]

(17) a.	GND		LOC	FIG	DEIC+POST[FIG]			Dene
	bek'eshich'elyií		*k'e*	*tł'ule*	*da-the-la*			
	table		on	rope	up-IMPF.3pl.S-PO.lie			

'The rope lies up on the table.'

b.		MAN	FIG	EXIST/POST		LOC		GND	German
	Das	*aufgerollte*	*Seil*	*ist/liegt*	*plötzlich*	*auf*	*dem*	*Tisch.*	
	the	3sg.S.IMPF.coil	rope	3sg.S.IMPF.be/lie	suddenly	on	the	table	

'The coiled rope is/lies suddenly on the table.'

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[51] The number in brackets presents the actual video clip, and the letter (–)A indicates whether an actor causes a certain relation or whether the FIGURE appears without a causer.

c.	MAN	FIG	EXIST/POST		LOC		GND	English
The	*coiled*	*rope*	*is/lies*	*suddenly*	*on*	*the*	*table.*	
the	3sg.S.PST.coil	rope	3sg.S.IMPF.be/lie	suddenly	on	the	table	

‘The coiled rope is/lies suddenly on the table.’

In (a) only the general orientation is profiled, i.e., the FIGURE is located in a static ‘on’-relation to the horizontal GROUND. The postposition expresses a static location of the FIGURE in concert with the verb stem and its prefixes. The deictic marker specifies this location in relation to the viewer’s perspective. The cohort does not specify that the FIGURE suddenly appears as opposed to the German and English examples.

In the (b) and (c), on the other hand, the FIGURE appears ‘suddenly’ on the table, while no causer is indicated. The German preposition *auf* ‘on’ expresses the horizontal orientation of the FIGURE in a static relation to the GROUND, i.e., *liegt auf dem Tisch* ‘lies on the table’. Either a very generic encoding is used with an existential verb to indicate the general idea of a FIGURE/GROUND relation that is only specified through the preposition *auf* or ‘on’, or a more specific encoding using a posture verb that refers to the horizontal position of the FIGURE in relation to the GROUND and a complete attachment to it.

I claim that the factor of a sudden appearance itself seems more important to profile in both examples than the location itself. Hence, the action is profiled, a temporal event that starts suddenly and ends nearly at the same time.

In the next example, the same FIGURE as in the last set is shown on a branch. Again, the scene does not show an agent manipulating the scene, i.e., the FIGURE just appears.

FIGURE = Rope; GROUND = Branch (2) [–A]

(18) a.	GND	MAN/LOC	FIG	DEIC+POST[FIG]	Dene
	k’es	*tthuk’e*	*tł’ule*	*da-the-la*	
	tree	knot(wood)	rope	up-IMPF.3sg.S-PO.lie	

‘The rope lies up the (fork of a) tree.’

b.	FIG	VFM		LOC	GND	German
Das	*Seil*	*hängt*	*plötzlich*	*über einem*	*Zweig.*	
the	rope	3sg.S.IMPF.hang	suddenly	over a	twig	

‘The rope hangs suddenly over a twig.’

c. FIG VFM LOC GND English
The rope hangs/appears around the branch/twig.
the rope 3sg.S.IMPF.hang/appear around the branch
'The rope hangs/appears around the branch/twig.'

Again, Dene speakers (a) do not express the appearance of the FIGURE, only the result of the transition. In German (b) and English (c), the FIGURE is profiled by the verb 'to hang' and the preposition 'over'/'around' in direct reference and contact to the GROUND. In addition, the scene displaying that the 'rope' appears in a sudden moment is also expressed with the adverbial *plötzlich* ('suddenly') or by the English verb *to appear*. Here, no causer is profiled, which implies the immediate determining factor of time in the unfolding event coming to an end, i.e., its position. Both the spatial and temporal coordinates are encoded in this imperfective event. As opposed to the Dene example, the sudden event is profiled in addition to the general location being around the GROUND.

The next set shows the same FIGURE, but presents a variation of the GROUND and a different relation to it as well as the involvement of an agent. This time, two objects, a table and a box, serve as references. The scene shows that a woman puts a rope into a box. The box itself stands on a table.

FIGURE = Rope; GROUND = Box (27) [A]

(19) a. GND$_2$ LOC GND$_1$ LOC FIG POST[FIG$_2$] Dene
bek'eshich'elyį k'e eritł'istili ye tł'ule ghį-la
table on letter/book(=box) in rope PERF.3sg.S-PO.lie
'The rope lay in the box on the table.'

b. FIG$_1$ FIG$_2$ LOC GND VMC German
Das Seil wird von der Frau in den Karton gelegt (der auf dem Tisch steht).
the rope 3sg.S.IMPF.be from the woman in the box 3sg.S.IMPF.put
(the.on.the.table.stand)
'The rope is being put in the box (itself standing on the table) by a woman.'

c. FIG$_1$ VMC FIG$_2$ LOC GND English
The woman puts the rope into the box (itself standing on a table).
the woman 3sg.S.IMPF.put the rope into the box (itself 3sg.S.PRG.stand on the table)
'The woman is putting the rope into the box (itself standing on a table).'

The verb stem in (a) encodes the rope as being profiled as the FIGURE. The act of putting something into the box is not mentioned in Dene example, even if the agent is shown in the video. The actor is not expressed, hence, the act of putting the rope into the box is not encoded, and by that we only have a static locational relation between the various objects.

German and English speakers also encode the two participants being 'on' the table. In German (b), the action of an agent—'the woman'—putting the rope 'in' the direct object and patient—the box—is encoded in a passive construction. The table is only secondary in the placement event. The same pattern is represented by the English example. Here, however, the prominent encoding pattern profiles the act of an agent putting an object X into an object Y in an active construction. The reference object is located on a stable and horizontal GROUND.

The next section presents some more examples profiling a flexible object serving as a FIGURE in different relations to the GROUND, this time a table cloth. The first set presents the flexible object being put on a horizontal GROUND by a causer.

FIGURE = Table Cloth; GROUND = Table (1) [A]

(20) a.	GND	LOC	FIG	DEIC+POST[FIG]	Dene
	bek'eshich'elyį	*k'e*	*dosó*	*da-the-ɬ-chúdh*	
	table	on	cloth	up-IMPF.3sg.S-CL-FO.lie	

'The cloth lies up on the table.'

b.	FIG	DEIC+POST[FIG]	GND	LOC	Dene
	yú	*da-the-ɬ-chúdh*	*bek'eshich'elyį*	*k'e*	
	cloth/cotton	up-IMPF.3sg.S-CL-FO.lie	table	on	

'The cloth lies up on the table.'

c.		FIG			LOC		GND	VMC	German
	Die	*Tischdecke*	*wird*	*(von der Frau)*	*auf*	*den*	*Tisch*	*gelegt.*	
	the	tablecloth	3sg.S.IMPF.be	(by.the.woman)	on	the	table	3sg.S.IMPF.put	

'The tablecloth is being put on the table (by the woman).'

d.		FIG$_1$	VMC		FIG$_2$	LOC		GND	English
	The	*woman*	*puts*	*the*	*tablecloth*	*on*	*the*	*table.*	
	the	woman	3sg.S.IMPF.put	the	tablecloth	on	the	table	

'The woman puts the tablecloth on the table.'

In examples (a-b), the FIGURE is encoded in an 'on'-relation to the horizontal GROUND. The cohort specifies the position by the use of a classicicatory verb stem indicating that the FIGURE is a flexible object in a full attachment-relation to the horizontal GROUND. Once again a deictic marker is used, i.e. the location of the FIGURE is instantiated in a certain relation to the speaker. However, once again, the actor appearing in the video is not encoded, only the result of the action.

In German and English (c-d), the causer or actor is encoded and by that the actual event of the FIGURE being put on the GROUND. Whereas the German and English speakers profile the event, Dene speakers encode the result.

The next set indicates that in some cases, not only the Dene speakers, but also the German and English speakers do not encode that the FIGURE suddenly appears in a static relation to the GROUND. In this example, a table cloth suddenly appears on the branch of a tree.

FIGURE = Table cloth; GROUND = Tree branch (21) [–A]

(21) a.	GND	LOC	FIG	DEIC+POST[FIG]	Dene
	k'es	*laghel*	*dosǫ*	*da-the-ł-chúdh*	
	poplar	above/over	cloth	up-IMPF.3sg.S-CL-FO.lie	

'The cloth lies/hangs up over a tree.'

b.		FIG	VCA	LOC		GND	German
	Die	*Tischdecke*	*hängt*	*über*	*einem*	*Zweig.*	
	the	tablecloth	3sg.S.IMPF.hang	over	a	twig	

'The tablecloth hangs over a twig.'

c.		FIG	VCA	LOC		GND	English
	The	*tablecloth*	*hangs*	*over*	*the*	*branch.*	
	the	tablecloth	3sg.S.IMPF.hang	over	the	branch	

'The tablecloth hangs over the branch.'

In all examples above, the FIGURE is profiled in a static topological relation to the GROUND. No additional information is encoded except in the Dene example, where the deictic marker 'up' is used again.

4.3.2. Round-like Objects in Various Relations to GROUND

The first example in this section presents a round object that appears without being visibly manipulated by an agent. The scene presents an empty table at first; after a few seconds a ball appear on the table.

FIGURE = Ball; GROUND = Table (11) [–A]

(22) a.	GND	LOC	FIG	DEIC+POST[FIG]	Dene
	bek'eshich'elyį	*k'e*	*dzół*	*da-the-ʔą*	
	table	on	ball	up-IMPF.3sg.S-RO.lie	

'The ball lies up on the table.'

b.	DOS	FIG	DEIC+POST[FIG]	Dene
	tsaré	*dzół*	*da-the-ʔą*	
	corner	ball	up-IMPF.3sg.S-RO.lie	

'The ball lies up in the corner.'

c.		FIG	VMC		LOC		GND	German
	Der	*Ball*	*liegt*	*plötzlich*	*auf*	*dem*	*Tisch.*	
	the	ball	3sg.S.IMPF.lie	suddenly	on	the	table	

'The ball lies suddenly on the table.'

d. FIG LOC GND English
The ball appears suddenly on the table.
the ball 3sg.S.IMPF.appear suddenly on the table
'The ball appears suddenly on the table.'

Once again, the surprising event of appearing is not profiled in Dene, but in German and English. In (22b) the ground is not overtly expressed. No agent is visible and the FIGURE appears on the table. Dene speakers do not encode this non-natural situation. English speakers (d) emphasize the sudden appearance of the FIGURE by the verb and the adverb.

The next set presents the situation in which the object is being placed by an agent on the GROUND. In this scene, a woman places the ball onto the table. This is different from the above scene in which the ball just appeared without a causer.

FIGURE = Ball; GROUND = Table (15) [A]

(23) a. GND LOC FIG DEIC+POST[FIG] Dene
bek'eshich'elyį k'e dzółt da-the-ʔą
table on ball up-IMPF.3sg.S-RO.lie
'The balls lies up on the table.'

b. FIG$_1$ VMC FIG$_2$ LOC GND German
Die Frau legt einen Ball auf den Tisch.
the woman 3sg.S.IMPF.put a ball on the table
'The woman puts a ball on the table.'

c. FIG$_1$ VMC FIG$_2$ LOC GND English
A woman puts a ball on a table.
a woman 3sg.S.IMPF.put a ball on a table
'A woman puts a ball on a table.'

This scene differs from the above one in that the FIGURE is placed by a woman. She is initiating the transition of the ball to be located in a topological relation with respect to the horizontal GROUND. However, whereas in English and German the agent is encoded, this is once again not the case in Dene. The Dene example encodes a static topological 'on' relation of the FIGURE to the GROUND, including a deictic marker that establishes a relationship between the viewer and the scene.

A different GROUND serves as the point of reference in the next set. Now, a tree or the fork of a tree serves as the reference point The example presents the FIGURE being manipulated by a woman who forces the FIGURE in between the fork of the tree. Hence, the video shows a woman putting a ball in between a fork.

FIGURE = Ball; GROUND = Tree/Branch (17) [A]

(24) a GND LOC FIG DEIC+POST[FIG] Dene

k'es geze dzóɬ ni-nį-ʔą
poplar between(the space between two objects) ball up.terminative-[?]-IMPF.3sg.S-RO.extend
' The ball ends up in between the poplar.'

b. FIG$_1$ FIG$_2$ LOC GND German
Eine Frau klemmt/stopft einen Fußball in die Astgabel.
a woman 3sg.S.IMPF.press a ball in the fork of the branch
'A woman presses a ball in the fork of the branch.'

c. FIG$_1$ FIG$_2$ LOC GND+LOC English
A woman presses a ball into a fork of a tree.
a woman 3sg.S.IMPF.press a ball into a fork of a tree
'A woman presses a ball into a fork of a tree.'

In example (a), the ball is in its terminative or resultive state, i.e., 'in between' the fork of the branch and thus the transition is implied here, but the agent is not encoded as in (b-c), in which we see that an agent is causing the ball to come into its position. Hence, here the manipulation by an agent is profiled as well as the general topological relation of the FIGURE with regard to the somehow open GROUND.

The following data set presents an agent placing the FIGURE into the GROUND, which itself stands on a horizontal surface elevated from the GROUND.

FIGURE = Cassava; GROUND = Box (7) [A]

(25) a. GND LOC FIG$_1$ LOC FIG$_2$ POST[FIG] Dene
bek'eshich'elyį k'e eritɬ'istili ye labada ghį-ʔą
table on writing in yam PERF.3sg.S-RO.lie
'The yam lies in the box (made of paper) on the table.'

b. FIG$_1$ FIG$_2$ LOC GND$_1$ POST LOC German
Eine Frau tritt mit einer Rübe an den Tisch heran und legt sie in den offenen
GND$_2$
Karton.
a woman 3sg.S.IMPF.approach with a yam at the table approach (on.the.a.box.stands) and 3sg.S.IMPF.put it in the open box.
'A woman with a yam approaches the table (on which a box stands) and puts it into the open box.'

c. FIG$_1$ FIG$_2$ LOC GND English
The woman puts the yam into the box.
the woman 3sg.S.IMPF.put the yam into the box.
'The woman puts the yam into the box.'

The Dene speakers encode the resultive event in which the FIGURE is in its endpoint location. The transition and the manipulation by the agent is not encoded. In German, the situation is expressed in a more detailed fashion. The agent is causing the FIGURE to change its place and to get into its telic position, i.e., into the box. The event is three-folded: the agent is entering the scene with the object to be placed, then the exact place of the telic endpoint is expressed, i.e., the box on the table. Finally, the FIGURE's transition is profiled changing its location from the agent's hand 'into' the box. In English, the second part of the transition in which the agent causes the FIGURE to change its position is expressed. The preposition 'into' indicates a motion or transition from place X to place Y.

4.3.3. Stick-like Object in Various Relations to GROUND

The next set presents a stick-like FIGURE being manipulated by an agent. The scene shows how a woman puts or places a stick at a tree.

FIGURE = Stick; GROUND = Tree/Earth (13) [A]

(26) a. Dene

GND	FIG	LOC	DEIC+POST[FIG]
k'es	*t'a*	*k'e*	*da-na-nį-tą*
poplar	stick	on	up-[?]-[?]-IMPF:3sg.S-SO.sit/lean.against

'A stick sits up on/leans up against the tree.'

b. Dene

GND	LOC	FIG	DEIC+POST[FIG]
k'es	*k'e*	*dechen*	*da-ni-nį-tą*
poplar	on	wood	up-[?]-[?]-IMPF.3sg.S-SO.sit/lean.against

'Wood leans up against the poplar.'

c. Dene

FIG	LOC	[?]POST[FIG]
dechen	*gáh*	*na-ghį-thi*
wood	close.near	in.place.of[?]-PERF.3sg.S-SO.fall/poke[52]

'Stick has fallen near the wood.'

d. German

	FIG$_1$	POST		FIG$_2$	LOC		GND
Die	*Frau*	*lehnt*	*einen*	*Stock*	*an*	*den*	*Stamm.*
the	woman	3sg.S.IMPF.lean	a	stick	at	the	tree

'The woman leans a stick at the tree trunk.

e. English

	FIG$_1$			FIG$_2$	LOC		GND
A	*woman*	*puts*	*a*	*stick*	*in.front.of*	*the*	*tree trunk.*
a	woman	3sg.S.IMPF.put	a	stick	in.front.of	the	trunk

'A woman puts a stick in front of the trunk'.

All of the 7 Dene speakers chose a different cohort in their description of the same scene. However, they all encoded the FIGURE and GROUND. The FIGURE was encoded as being vertically aligned to the ground. In German, the posture verb *lehnen* 'to lean' profiles the manipulation of the FIGURE in a (partly) attached relation to the GROUND. The posture verb also implies that the FIGURE must be in a vertical position to the ground. The agent manipulating the FIGURE is encoded in German as well as English.

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[52] Various related stems are:*–tthi, –tthigh, –tthi, –tthi, –tthił*: 'to push' (a stick); 'to poke'; 'to stick up a stick'; *–gáh*: 'close', 'near' (beside physically) (beside it); *–ghis*: 'to push' (with a stick, held vertically, moving its end horizontally).

The next set again presents a stick-like object, this time a bottle, in an 'in between' relation to the GROUND, the fork of the branch. Here, the object appears in the clip without showing the agent of the manipulation.

FIGURE = Bottle; GROUND = Tree/Branch (22) [–A]

(27) a.	GND	LOC	FIG	DEIC+POST[FIG]	Dene
	k'es	*geze*	*tutili*	*da-the-t'ą*	
	poplar	between	bottle	up-IMPF.3sg.S-SO.sit/lean.against/lie	

'The bottle sits up in between the poplar.'

b.	GND	LOC	FIG	[?]+POST[FIG]	
	k'es	*geze*	*tutili*	*na-ghį-ʔą*	Dene
	poplar	between	bottle	[?]-IMPF.3sg.S-SO.stick.upright	

'The bottle (itself being in an upright position) sticks in between the poplar.'

c.		VFM		FIG	LOC		GND	German
	Plötzlich	*klemmt*	*eine*	*Flasche*	*in*	*der*	*Astgabel.*	
	suddenly	3sg.S.IMPF.stuck	a	bottle	in	the	fork.of.a.branch	

'A bottle is suddenly stuck in the fork of a branch.'

d.		FIG	VFM		LOC		LOC		GND	English
	A	*bottle*	*appears*	*suddenly*	*in*	*the fork*	*of*	*the*	*branch.*	
	a	bottle	3sg.S.IMPF.appear	suddenly	in	the fork	of	the	branch	

'A bottle appears suddenly in the fork of the branch.'

In Dene, the verb stem does not encode the sudden appearance of the FIGURE. The FIGURE is placed with respect to the GROUND in a vertical extension. In German and English, the sudden appearance is expressed, whereas its position as being upright is not specified.

Another manipulative situation is expressed in the next example. This time, an agent places the stick-like object, and hence a transition is profiled in German and English.

FIGURE = Ladder; GROUND = Tree (24) [A]

(28) a.	GND	FIG	DEIC+POST[FIG]	Dene
	k'esghel	*bek'okanats'ediłi*	*ni-nį́-tą*	
	poplar	ladder	[?]-[?]-IMPF3sg.S-SO.sit/lean against	

'The ladder sits/leans up against the poplar.'

b.		FIG		LOC		GND	VCA	German
	Die	*Leiter*	*wird*	*an*	*einen*	*Baum*	*gelehnt*	
	the	ladder	3sg.S.IMPF.be	at	a	tree	3sg.S.IMPF.lean	

'The ladder is being leaned at a tree.'

c. FIG$_1$ VCA FIG$_2$ LOC GND English
A woman puts a ladder at a tree.
a woman 3sg.S.IMPF.put a ladder at a tree
'A woman puts a ladder at a tree.'

The Dene cohort in (a) encodes the FIGURE as being in a vertical, partly attached relation to the GROUND; neither its manipulation nor the agent of its manipulation are profiled. In the German and English examples in (b) and (c), however, the FIGURE's manipulation is profiled. In (c), the agent is encoded and the manipulation is encoded by an active construction, whereas in the German example in (b), the agent is not explicitly referred to, because a passive construction is at work; here, the verb together with the preposition encode a principal vertical alignment to the ground.

The next set presents a different verb stem in Dene that encodes in general a stick-like object being poked, here 'in between' a fork, i.e., in addition to the general topological relation we also notice a motion event. This time, the actor is shown manipulating the FIGURE.

FIGURE = Cassava; GROUND = Tree/Branch (31) [A]

(29) a. GND LOC FIG [?]+POST [FIG] Dene
k'es geze labada na-ghį-tthik
poplar between potato [?]-IMPF.3sg.S-SO.poke/stick
'A potato sticks between the poplar.'

b. FIG$_1$ FIG$_2$ LOC GND German
Eine Frau klemmt eine Süßkartoffel in die Astgabel.
a woman 3sg.S.IMPF.stick a yam in the fork of branch
'A woman sticks a yam in the fork of branch.'

c. FIG$_1$ FIG$_2$ LOC LOC LOC+GND GND English
A woman puts a sweet potato in between the fork of the branch.
a woman 3sg.S.IMPF.put a sweet potato in between the fork of the branch
'A woman puts a sweet potato in between the fork of the branch.'

In (a), the cohort profiles first and foremost the FIGURE's spatial orientation. The FIGURE is placed between the fork of the branch. It also expresses the general idea of the FIGURE's specific orientation with regard to the vertical GROUND. In German and English (b-c), a transition of the FIGURE is expressed, i.e., a change of location as caused by an agent (here: a woman). The Dene example profiles the degree of specificity of the FIGURE not only located between, but also in an 'up'-position.

The next example presents a stick-like FIGURE being placed into the ground by an agent. The video shows the manipulation of the FIGURE being stuck into the ground.

FIGURE = Stick; GROUND = Ground (41)[A]

(30) a. GND LOC FIG [?]+POST [FIG] — Dene
k'es gah dechen na-ghį-tthik
poplar near/beside wood in.place.of[?]-IMPF.3sg.S-SO.poke/stick
'The stick (wood) sticks near the poplar.'

b. FIG [?]+POST[FIG] — Dene
dechen na-ghį-thi
wood in.place.of[?]:IMPF:3sg.S-SO.poke/stick
'A stick (wood) sticks […].'

c. FIG$_1$ FIG$_2$ LOC GND — German
Eine Frau steckt einen Stock in die Erde.
a woman 3sg.S.IMPF.stick a stick in the ground
'A woman sticks a stick in the ground.'

d. FIG$_1$ FIG$_2$ LOC GND — English
A woman puts a stick into the ground
a woman 3sg.S.IMPF.stick a stick into the ground
'A woman sticks a stick into the ground.'

Dene speakers in (a) express a topological relation and a detailed degree of specificity. In this example, the GROUND is the tree, a relation of proximity is expressed. This is different from (30b) where only a general location is expressed by the verb stem. In German and English, speakers encode also a topological relation and, in addition, the manipulation of the FIGURE by an agent. However, in these examples, the GROUND serves as the frame of reference. This is a topological 'in'-relation, not a projective relation.

4.3.4. Plural Object in Relation to the GROUND

This section presents a set of descriptions of a scene in which a plural object simply appears on a horizontal surface.

F = Beans; G = Table (3) [−A]

(31) a. GND LOC FIG DEIC+POST[FIG] — Dene
bek'eshich'elyį k'e jiegaié dá-the-dzái
table on beans up-IMPF.3pl.S-PO.lie
'The beans lie up on the table.'

b. LOC GND POST FIG — German
Aufdem Tisch liegen ganz plötzlich Bohnen.
on the table 3pl.S.IMPF.lie quite suddenly beans
'Beans quite suddenly lie on the table.'

c.	FIG	EXIST			LOC	GND		English
	The	*beans*	*are/appear*	*suddenly*	*on*	*the*	*table.*	
	some	beans	3pl.S.IMPF.be/appear	suddenly	on	the	table	

‘The beans are/appear suddenly on the table.’

The Dene example in (a) does not express the sudden appearance of the plural FIGURE as opposed to German and English speakers. This semantic and conceptual difference is even more drastic in the example given below that actually shows the agent of the manipulation.

FIGURE = Beans; GROUND = Table (5) [A]

(32) a.	GND	LOC	FIG	DEIC+POST[FIG]	Dene
	bek’eshich’elyį	*k’e*	*jiegaié*	*dá-the-dzaí*	
	table	on	beans	up-IMPF.3pl.S-PO.lie	

‘The beans lie on the table.’

b.	FIG			DEIC+POST[FIG]	Dene
	jiégaié	*delzen*	*dájá*	*da-ghé-l-ʔa*	
	beans	it.is.black	something	up-PERF.3pl.S-CL-RO.lie	

‘Black beans lie up.’

c.		FIG$_1$	VMC					FIG$_2$	LOC		GND	German
	Eine	*Person*	*legt*	*zwei*	*Hände*	*voll*	*roter*	*Bohnen*	*auf*	*den*	*Tisch.*	
	a	person	3sg.S.IMPF.put	two	hands	full	red	beans	on	the	table	

‘A person puts two hands full of beans on the table.’

d.		FIG$_1$	VMC				FIG$_2$	LOC		GND	English
	A	*woman*	*puts*	*a*	*handful*	*of*	*beans*	*on*	*the*	*table.*	
	a	woman	3sg.S.IMPF.put	a	handful	of	beans	on	the	table	

‘A woman puts a handful of beans on the table.’

A difference can be singled out between the Dene, German, and English examples. In all cases, Dene speakers do not profile the causer, the person that manipulates the FIGURE’s location by moving it from location A to B. In English and German, this transition is expressed throughout the data. In Dene, only the result is expressed. However, there is a difference between the Dene examples in (32a) and (32b): Whereas in (a) the GROUND is expressed explicitly, in (b) only the classificatory verb stem plus affixes imply that the GROUND is a horizontal one.

I am going to present some conclusions in the next section that motivate and support my general critique with regard to the elicitation tools.

4.4. General Conclusion

The most interesting aspect is a reversal of degree of specificity as opposed to the *TRM* results. Both German and English speakers are more specific in the description of the various scenes. They encode the various participants in a scene, i.e., the causer and the displacement operation of the FIGURE, and by that, the trajectory. The manipulation of the FIGURE to be placed is profiled as well as a static topological relation. Dene speakers, on the other hand, only profile the resultive event in which the FIGURE is already at its location. This location is also profiled as a static topological relation.

The most interesting result for Dene is the coherent usage of posture cohorts aligned with a postposition. Such classificatory systems have been expected since the *TRM* revealed exactly the same consistent usage of such systems. The only difference with regard to the *CP* results is that the *TRM* indicates mainly the usage of cohorts without a postposition, whereas the *CP* shows the usage with a postposition. Besides, we often find the use of a deictic marker.

The German and English frequency account given above implies the general usage of existence or posture verbs aligned by a preposition, mostly the locative marker 'on'. This marker indicates that the FIGURE/GROUND alignment is a horizontal one with full or partial contact between the participants. The all-purpose marker *k'e* does semantically do the same in Dene, but I want to argue that it is an ambiguous locative. The different meanings depend on the various contexts.

It seems that Dene speakers reduce the semantic information to a minimum in the *CP*. This is diametrically opposite to the German and English results. Hence, the two studies indicate two different general results. Whereas the *TRM* study indicates the high degree of specificity in Dene and a coherent encoding of perspective and dynamicity, i.e., non-topological relations, the *CP* presents the opposite results with regard to the degree of specificity and dynamicity. The languages are similar with regard to the general topological encoding patterns being static and based on Euclidean geometry as a fixed coodinate system.

The diverse Dene patterns of the *TRM* have not been confirmed by the results of the *CP*. I assume that this is at least partly due to a task or a priming effect, together with the depiction of highly unnatural situations (objects appearing out of the blue) in the *CP* study. To reveal more insights into the semantic range and differences, I therefore suggest a different tool that allows for more naturalistic stimuli. I will present this tool and the elicited data in the next Chapter 5.

Chapter Five

The Spatial Categorization Elicitation Tool

5.1. The Elicitation Tool

This chapter presents the final elicitation tool, the *Spatial Categorization Elicitation tool* (*SPACE*) developed by myself. This elicitation tool is based on 95 short video clips (approximately 10 seconds per clip) presented in a random order. As a set, the clips exploit and exhaust a number of imaging parameters in addition to the general FIGURE/GROUND asymmetries as presented in both the *TRM* and *CP* protocols. The scenes vary with respect to the FIGURES' various shapes, sizes, and materials. Moreover, I have manipulated some FIGURE/GROUND alignments, the speaker's potential perspective, the scope, scale, proximity, functionality, and finally deictic and vectorial spatial information.

The tool's primary aim is to determine more specifically the options speakers have in their choice of language to describe spatial relations. The test is by far not extensive enough to reveal (a) the whole range of classificatory verbs in Dene, or (b) the full range of spatial semantics in general. Nonetheless, *SPACE* is designed to provide a more refined picture of what is actually going into the encoding of presumably topological spatial relations.

To elicit different cohorts and to explore the various morphosyntactic affordances in the various languages, the encoding of different FIGURE/GROUND asymmetries is at focus in *SPACE*. Hence, I developed a number of FIGURE/GROUND situations that include different animate and inanimate objects in relation to dynamic and static reference points. Some of the objects are stone(s) on the ground or in a vessel, stick(s) on the ground, bottle(s) on a table/ground or a moving surface (birds on water, leaves on water, boat on water). In addition, my elicitation images consist of singular, dual or plural human figures in different static positions, e.g., sitting on a rock, on the ground, leaning against a tree, and in different dynamic situations, e.g., walking away from or towards the viewer.[53] I also manipulated different distances to the camera, i.e., three different viewing distances were used to extract the semantics of different deictic perspectives between the vantage point and the FIGURE: (a) proximate, (b) medial and (c) distal. Furthermore, the number of objects was manipulated, e.g., a person puts one or more objects on or into a vessel or places it/them somewhere above or below (stone(s) on table, bottle(s) standing/laying on table or ground, keys on table, cloth folded/spread out on table/ground). Different orientations were imposed to reveal more insights into the frames of reference used by Dene and other speakers, but also to show that the viewer is crucial in the construction of the FIGURE/GROUND relation.

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[53] For the purpose of this dissertation I will present only the results from predominantly topological static scenes. Hence, dynamic scenes such as 'people walking down the lane' are not included because of the

5.2. Method

5.2.1. Participants

10 native speakers of Dene, solicited primarily from the Cold Lake First Nation Reserve in east-central Alberta, Canada, served as paid language consultants for this study. Both native and near-native speakers of this language were interviewed (only the elder speakers can be actually considered as bilingual, speaking English as well as Dene on a daily basis) at their convenience in Edmonton or in Cold Lake. Of the 10 speakers who were interviewed, 7 were female and 3 male. Only one is affiliated with academia. The Dene speakers ranged in age from 35-85 years, but the majority of the speakers interviewed in this test were over 55 years old. As for the selected examples below, only results from elder speakers are used for the reasons given above.

For comparative purposes, I asked 10 speakers of standard German (aged 30-61 years, all academics), 10 speakers of Canadian English (aged 24-45; including 3 undergraduate students of linguistics at the University of Alberta and 7 speakers not affiliated with linguistics or academia), and 4 speakers of standard Norwegian (Bokmål) (aged 22-65; 2 speakers not affiliated with linguistics or academia). The range of speakers depended on the funding as well as on the availability of speakers.

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inherent dynamic quality of the event. Again, this dissertation is about revealing some insights into the usage of various imaging features in supposedly topological and speaker-neutral situations.

5.2.2. Materials

The *SPACE* test was designed as an offline task presenting 95 video clips or photographs. 60 of the presented situations are static relations such as ‘sticks in sand’, ‘rocks on ground’, ‘fruits on table’, while 35 are dynamic situations such as ‘people walking down the lane’, ‘ducks on water’ (a still photograph of ducks on water and a video clip in which ducks are actually swimming on the water), or ‘man cutting wood’. Dene speakers from Cold Lake participated as actors in these scenes. They were filmed while carrying out daily activities such as putting on a jacket or shoes, chopping wood or inserting/removing a screw in/from a piece of wood. In addition to the *TRM* and *CP* protocols, I used common objects in a natural environment that could be realistically manipulated or interacted with by persons of almost any cultural background. The rationale was that if indeed objective and speaker-independent parameters exist, then the spatial relations being expressed should be fairly consistent cross-linguistically, except from morphosyntactic differences among the languages.

Table 15: *SPACE* Inventory: Overall Sample of FIGURE/GROUND Asymmetries

FIGURE/GROUND ASYMMETRY	CLV/FIG	EVENT	FIGURE/GROUND ASYMMETRY	CLV/FIG	EVENT
ANIMATE OBJECT (human beings, animals) Dynamic Events: walk, swim, sit, stand			ANIMATE OBJECT (human beings, animals) Dynamic Events: walk, swim, sit, stand		
Person puts a screw into wood/screwing	AO (SG)	DYN	Squirrel eats nuts and runs away	AO (SG)	DYN
Person unscrews/pulls out screw from the wood	AO (SG)	DYN	Ducks swim on water (left to right)	AO (PL)	DYN
Person puts jacket on	AO (SG)	DYN	3 ducks swim on water (right to left)	AO (PL)	DYN
Person takes jacket off	AO (SG)	DYN	Person walks away	AO (SG)	DYN
2 persons walk down lane/away from viewer	AO (PL)	DYN	Person approaches viewer	AO (SG)	DYN
2 persons walk down lane/approaching viewer	AO (PL)	DYN	Insect crawls up sand	AO (SG)	DYN
Duck is on water (distal to shore/viewer)	AO (SG)	STAT	Crow walks along shore	AO (SG)	DYN
3 persons walk down lane (proximal to distal)	AO (PL)	DYN	Person puts shoes on	AO (SG)	DYN
3 persons approach viewer (distal to proximal)	AO (PL)	DYN	Person takes shoes off	AO (SG)	DYN
3 persons walk down lane (away from viewer to	AO (PL)	DYN	Person cuts/hacks hatchet into stump	AO (SG)	DYN

distal)					
3 persons approach viewer	AO (PL)	DYN	Person cuts log (placed on a stump)	AO (SG)	DYN
Person approaches viewer (from medial)	AO (SG)	DYN	Birds on shore	AO (PL)	DYN
Person walks down lane (from proximal)	AO (SG)	DYN			
ANIMATE OBJECT (human beings, animals): Static Relations (stand, sit, be at rest)			ANIMATE OBJECT (human beings, animals): Static Relations (stand, sit, be at rest)		
Person stands in front of a tree	AO (SG)	STAT	2 persons sit in front of a rock (distal)	AO (PL)	STAT
Person stand beside/to right of a tree	AO (SG)	STAT	2 persons sit on rock (proximal)	AO (PL)	STAT
2 persons stand on a rock (distal)	AO (PL)	STAT	3 persons sit in front of a rock (distal)	AO (PL)	STAT
2 persons stand on a rock (proximal)	AO (PL)	STAT	3 persons sit on a rock (proximal)	AO (PL)	STAT
Person sits in front of tree	AO (SG)	STAT	3 persons stand on rock (proximal)	AO (PL)	STAT
Person sits beside/right of tree	AO (SG)	STAT	3 persons stand on rock (distal)	AO (PL)	STAT
Person sits on rock (proximal)	AO (SG)	STAT	2 ducks on water	AO (PL)	STAT
Person sits in front of rock (distal)	AO (SG)	STAT	Duck on water	AO (SG)	STAT
Person sits behind/beside rock (distal)	AO (SG)	STAT			
AMORPHOUS MASS lie, exist, be at rest					
Moving waves	AM	DYN			
Moving waves (parallel to the shore)	AM	DYN			
ROUND OBJECT lie, exist, be at rest			ROUND OBJECT lie, exist, be at rest		
Rocks on beach/close to the beach (proximal)	RO/PO	STAT	Glass beside/left of the plate	RO	STAT
Rock in water (distal)	RO	STAT	Stones above each other	RO/PO	STAT
Cup beside/to the right of the plate (on table)	RO	STAT	Stones on stump (distributed)	RO/ PO	STAT
FLEXIBLE OBJECT lie, exist, be at rest			FLEXIBLE OBJECT lie, exist, be at rest		
Towel on the table (proximal)	FO	STAT	Notebook on table (proximal)	FO	STAT
Towel on table (folded)	FO	STAT	Plastic bag on ground (lying)	FO	STAT
Paper bag on ground (distal)	FO	STAT	Plastic bag on ground (standing)	FO	STAT
STICK-LIKE OBJECT lie, exist, be at rest			STICK-LIKE OBJECT lie, exist, be at rest		
Keys on table (proximal)	SO/PO	STAT	Stick in sand	SO	STAT
Feather on ground (proximal)	SO	STAT	3 sticks in sand	SO/ PO	STAT
Pile of log (distal)	SO/PO	STAT	Bananas on table (in the middle of it)	SO	STAT

Hatchet in front of a stump	SO	STAT
Hatchet on stump	SO	STAT
Hatchet beside/right of stump	SO	STAT
Hatchet behind stump	SO	STAT
Cones on tree	SO /PO	STAT
Bottle on towel (distal)	SO	STAT
Bottle on stump (proximal)	SO	STAT
Wine bottle on ground (distal)	SO	STAT
Water bottle in water	SO	DYN
Poles lined up (different directions)	SO	STAT
Boat on water moving from right to left	SO	DYN
Log on water (moves)	SO	DYN
Boat (right to left), 180°	SO	DYN
Bottle on stump (proximal)	SO	STAT
Bottle on ground (distal)	SO	STAT
Bottle on table (medial)	SO	STAT
Poles lined up "..."	SO	STAT
Poles lined up "…"	SO	STAT
Poles lined up "…"	SO	STAT

Table 15 presents the various FIGURE/GROUND asymmetries and the manipulations of perspective relations I used in the pilot study. The majority of FIGUREs are stick-like objects, living beings, plural objects, round, flexible and amorphous mass objects. This selection is by far not exhaustive for Dene classificatory verb stems or for topological spatial relations in general. As such, it is meant to be a step into a direction where more naturalistic tools are used in various FIGURE/GROUND relations to elicit more precise data.

5.2.3. Design and Procedure

The same speakers as for the *TRM* and *CP* were asked by a native Dene speaker (the same consultant who assisted in the other two tasks) to answer two questions depending on the scene. If a scene was presented by a static clip, the researcher prompted the speaker by the question "Where is object X?", similar to the question in the *TRM* study. If dynamic descriptions were expected as in 'two people walking' or 'ducks swimming on water', speakers were asked to provide the best or most natural description of the scene in addition to the "Where"-question above.[54]

The protocol was implemented into an I-Movie program on a Power Book G4 laptop. The results of these field sessions were recorded through the built-in microphone of the Power Book G4 laptop computer using Sound Studio. Sound Studio is a helpful tool to transcribe the responses. In addition, the sessions were transcribed by me and a native-speaker confederate, and entered onto an Excel score sheet.

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[54] I encourage the researcher in any future tests to ask speakers for alternatives and to compare between scenes. For example, one might say: "In that situation you said something like X, this situation seems similar to Y, so what is the difference?"

5.2.4. *Results and Discussion*

This section presents the frequency count of all of the actual response patterns I have elicited with Dene, German, Norwegian, and English speakers.

I present frequency counts by language based on the used cohorts, i.e., the usage of a locative marker and a classificatory (posture or neuter verb) or existential verb.

Table 16: Dene Frequency Count

Device:	*Speaker*:	1	2	3	[illegible]	5	6	7	8	9	10	TOTAL	%
Verb-type	Static	60	60	60	60	60	60	60	60	60	60	**600**	**63.2**
	Dynamic	35	35	35	35	35	35	35	35	35	35	**350**	**36.8**
												950	**100**
Postposition	*on, in, at, near, beside* etc.	80	79	79	80	79	80	80	78	80	81	**796**[1]	**83.8**
	COHORT SYSTEMS												
	FIG-*on*-GND-POST/FIG	57	56	57	57	56	57	54	57	55	57	**563**	**70.8**
	FIG-*in/inside*-GND-POST/FIG	13	11	12	11	14	14	16	15	18	9	**133**	**16.7**
	FIG-*next to/beside/near*-GND-POST/FIG	5	5	7	6	5	4	5	4	5	6	**52**	**6.5**
	misc prep, e.g. *behind, in between, at*	5	5	3	6	5	5	5	4	2	8	**48**	**6.0**
	TOTAL	80	77	79	80	80	80	80	80	80	80	**796**	**83.8**

[1] The difference of 154 utterances (overall number 950 utterances minus postpositional occurances) indicate the usages in which no locative marker is used, as in 'people approach viewer', 'log floats/swims'.

In Dene, most cohorts involve a static posture verb. The English and Norwegian speakers predominantly use a locative marker and an existential verb cohort, whereas the Dene and German speakers use a classificatory cohort. In Dene, there are more detailed cohorts to be found which give more specific information about the various imaging features of the scene in addition to the FIGURE/GROUND asymmetry. It has to be added that this table obscures the detailed information in Dene with respect to the FIGURE's degree of specificity, the deictic marking etc. Nearly all posture verb usages add a deictic marker, which again refers to pragmatic interference.

All usages containing the postposition *k'e* can also be encoded only via the verb cohort. Hence, 'a cup' or 'a plate' can be 'on' a table, but also simply 'lie up there'. A bottle is standing 'upright', but not necessarily 'upright on'. Hence, the relation to the GROUND is secondary, while, e.g., the FIGURE's characteristic features, its general orientation or its spatial relation to the speaker's location are profiled.

Table 17: German Frequency Count

Device	*Speaker*	1	2	3	4	5	6	7	8	9	10	TOTAL	%
Verb- type[1]	Static	60	60	60	60	60	60	60	60	60	60	**600**	**94.0**
	Dynamic	35	35	35	35	35	35	35	35	35	35	**350**	**6.0**
												950	**100**
Prepositions[2]		79	80	78	77	79	80	80	73	76	76	**778**	**81.2**
	∑ = no locative marker[3]	16	15	17	18	16	15	15	22	19	19	**172**	**18.8**
												950	**100**
Posture verbs[4]	*liegen* 'lie', *stehen* 'stand', *sitzen* 'sit' etc.	71	71	70	71	69	71	70	70	79	79	**721**	**75.9**
	COHORT SYSTEMS												
	FIG-POST-LOC-GND	69	68	69	67	70	69	68	68	70	69	**687**	**88.3**
	➢FIG-POST-*auf* 'on'-GND	57	54	55	53	56	54	57	58	55	53	**552**	**80.5**
	➢FIG-POST-*in/im* 'in'-GND	9	9	8	9	8	7	6	8	9	9	**82**	**11.8**
	➢FIG-POST-*an/am* 'at'-GND	1	1	0	2	2	2	1	1	1	2	**15**	**2.3**
	➢MISC	3	5	4	4	6	3	3	4	3	3	**38**	**5.4**
												687	**100**
	Poststure verbs												
liegen 'lie'	➢FIG-POST(*liegen* 'lie')-LOC-GND	27	26	28	28	27	28	27	28	28	28	**303**	**42.1**
stehen 'stand'	➢FIG-POST(*stehen* 'stand')-LOC-GND	21	20	21	20	21	19	20	22	21	20	**205**	**28.4**
sitzen 'sit'	➢FIG-POST(*sitzen* 'sit')-LOC(*auf* 'on', *neben* 'beside', *unter* 'under')-GND	6	5	6	6	5	6	6	5	5	5	**55**	**7.6**
												563	**78.1**
	Misc											**158**	**21.9**
												721	**100**

[1] Presents the overall number of the static versus dynamic distribution of FIGURE/GROUND asymmetries.

[2] Gives the overall number of used prepositions.

[3] No locative marker means scenes in which, e.g., a person is cutting wood or people are just walking, not specifying something like 'down the lane'.

[4] All German speakers were likely to use both existential and posture verbs, hence, the number 55/95 is also applicable for existential verbs. However, when asked they preferred the posture verb structures as in *Die Axt steht/ist neben dem Stamm* 'the hatchet stands/is beside the stump' or *Das Notizbuch liegt/ist auf dem Tisch* 'the notebooks lies/is on the table', *Die Ente schwimmt/ist auf dem Wasser* 'the duck swims/is on the water'. As we will see below, English and Norwegian speakers prefer the usage of an existential verb only.

Table 17 supports some of the *TRM* and *CP* results, namely that the German speakers (all of them academics or academically educated) use posture verbs to encode the various FIGURE/GROUND asymmetries. I believe that this is a certain degree of specificity as opposed to the usage of the more general existential marker 'be at, on, in'. One might argue that posture verbs have a similar function to classificatory verb systems since both specify the FIGURE's characteristics.[55] However, in German, the posture verb does not change with respect to the FIGURE as long as the FIGURE has general features that match the quality of the specific posture verb. Hence, only certain things can lie because they can be in a fully attached position to a horizontal GROUND. But the verb does not change if the FIGURE is a notebook, a rope, or a paper bag as it does in Dene.

Summarizing, we see that there is stable usage of a locative marker in addition to a posture verb in German encoding the FIGURE/GROUND asymmetry. The next table presents the summary of the Norwegian speakers and their language-related behaviors.

Table 18: Norwegian Frequency Count

Device:	*Speaker*:	1	2	3	4	TOTAL	%
Verb-type	Static	60	60	60	60	**240**	**63.2**
	Dynamic	35	35	35	35	**140**	**36.8**
						380	**100**
Preposition	*on, in, at, near, beside* etc.	80	77	79	80	**316**	**83.2**
Existential verbs	COHORT SYSTEMS						
	er 'be'	80	77	79	80	**320**	**100**
	FIG-be-*on*-GND	57	56	57	57	**227**	**59.8**
	FIG-be-*in/inside*-GND	13	11	12	11	**47**	**12.4**
	FIG-be-*next to/beside/near*-GND	5	5	7	6	**23**	**6.1**
	Misc prep, e.g. *behind, in between, at*	5	5	3	6	**19**	**5.1**
	TOTAL	80	77	79	80	**316**	**83.3**

Table 18 shows that the predominant usage is an existential verb plus a locative marker (83.2%). The most prominent marker is by far the preposition 'on' (59.8%) that overrules all the other prepositions ('in'/'inside' = 12.4%; 'next to'/ 'beside'/ 'near' = 6.1%; misc = 5.1%). Basically, speakers of Norwegian relate the various FIGURE/GROUND asymmetries with a general existential verb and an all-purpose 'on' locative marker. This is very similar to the English pattern below. Note that I am by far not claiming that English, Norwegian, or German locative markers are cognate, but I think it is fair to say that they do relate the various FIGURE/GROUND asymmetries in terms of a constant relationship. In all cases, a horizontal surface supports the horizontal or vertical FIGURE from below.

Table 19: English Frequency Count

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[55] In German the posture is only implicitly encoded, i.e., as a German speaker, I know that a bottle can only 'stand' if it is of an elongated shape and placed in a certain upright position, but the verb does not explicitly express that the elongated object is in a vertical position to the horizontal GROUND as it does in Dene.

Device:	*Speaker:*	1	2	3	4	5	6	7	8	9	10	**TOTAL**	**%**
Verb-type	Static	60	60	60	60	60	60	60	60	60	60	**600**	**63.2**
	Dynamic	35	35	35	35	35	35	35	35	35	35	**350**	**36.8**
												950	**100**
Preposition	*on, in, at, near, beside* etc.	80	77	79	80	80	80	80	80	80	80	**796**	**83.8**
	COHORT SYSTEMS												
	FIG-be-*on*-GND	57	56	57	57	56	57	54	57	55	57	**563**	**70.8**
	FIG-be-*in/inside*-GND	13	11	12	11	14	14	16	15	18	9	**133**	**16.7**
	FIG-be-*next to/beside/near*-GND	5	5	7	6	5	4	5	4	5	6	**52**	**6.5**
	Misc prep, e.g. *behind, in between, at*	5	5	3	6	5	5	5	4	2	8	**48**	**6.0**
	TOTAL	80	77	79	80	80	80	80	80	80	80	**796**	**83.8**

Table 19 presents the overall frequency of the English preposition cohorts. A marked reliance on static encoding patterns (63.2%) as opposed to dynamic (36.8%) is apparant. Moreover, most of the examples follow a FIGURE-be-locative-GROUND patterns (83.8 %) and the locative 'on' is heavily relied on (at 41.5 %) to profile the FIGURE's orientation with respect to the GROUND, a finding which is similar to the *TRM* results for English. Note that all dynamic situations of *SPACE* are encoded as dynamic, and all static situations are also static in English. Hence, there is no mismatch between the expected speaker behavior and the actual results. English speakers encode the basic information necessary to relate the various FIGURE/GROUND asymmetries.

The overall number of utterance is 950. Out of these, 796 encodings use a preposition, hence, the difference of 154 reflects the actual scenes in which human beings or animals are in motion or act somehow as in 'persons walk down the lane', 'ducks swim (in water)' etc. The overall verb pattern is the usage of an existential structure encoding a general and neutral orientation of the FIGURE.

5.3. *SPACE* Responses

5.3.1. Static FIGUREs Supported by Horizontal Surface

This section begins with static topological relations between FIGURE and GROUND. The results present the prototypical relation between a FIGURE located with reference to a horizontal GROUND. Various situations and manipulations of objects in different relational events are presented. Most of the cohorts used have been established in the *TRM* and *CP* tasks, meaning that *SPACE* is a step to explore more precisely the cognitive semantic processes in the instantiation of various FIGURE/GROUND asymmetries. In other words, my focus is on the various degrees of specificity and the static-dynamic distinctions in particular. The most important question is with respect to the encoding processes: What are the precise information features that are involved in encoding processes of spatial and temporal information?

In this section, a variety of FIGURE/GROUND situations in which a prominent and salient GROUND serves as the supporting reference point positioned below the FIGURE are presented. Hence, the smaller FIGURE is situated with respect to a larger horizontal surface such as 'table', 'shore'/'beach', 'stump', etc. The first situation presents a horizontal GROUND—'table'—on which two objects are placed: a plate in the foreground and a cup located to its right (assuming a relative frame of reference anchored to the speaker/viewer). The assistant was asked to prompt the speaker with the question "Where is the cup?". A projective relation might be expected here as a response to the question, since the topological relation between the cup and the table is not directly queried.

Examples (33) indicate a topological static relation between the objects, but also a projective relation.

CUP {BESIDE/ON THE RIGHT OF} PLATE ON TABLE
Prompt: *Where is the cup?*

(33) a.	FIG$_1$		FIG$_2$		FIG$_3$	LOC	DEIC+POST[FIG]	Dene
	tth'aíkalé	*chú*	*tsǫmbitili*	*chú*	*bek'eshich'elyį*	*k'e*	*da-the-la*	
	Cup	and	plate	and	table	on	up-IMPF.3sg.S-POexist/lie	

'The cup and plate lie on the table.'

b.		FIG	POST/EXIST	LOC		GND	German
	Die	*Tasse*	*steht/ist*	*neben*	*dem*	*Teller.*	
	the	cup	3sg.S.IMPF.stand/be	beside	the	plate	

'The cup stands/is beside the plate.'

c.	FIG	EXIST/POST	LOC		LOC	GND	Norwegian
	Kopp-en	*er/står*	*på/ved*	*høyre/siden*	*av*	*tellerk-en.*	
	cup-the	3.sg.S.IMPF.be/stand	on/at	right/side	of	plate-the	

'The cup is/stands to the right of the plate.'

d.		FIG	EXIST	LOC DOS		GND	English
	The	*cup*	*is*	*beside/to the right of*	*the*	*plate.*	
	the	cup	3sg.S.IMPF.be	beside/to.the.right.of	the	plate	

'The cup is beside/to the right of the plate.'

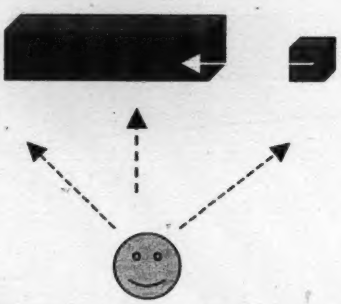
The main difference between the European and Dene speakers' results is that Dene speakers tend to express a more global topological relation rather than a more contingent and specific projective relation. The Dene example in (33a) describes two FIGUREs in a general 'on'-relation to the GROUND. The locative marker encodes the location of the cup and plate being on the table. The different FIGUREs are related to each other only in the sense that they are mentioned from the cup (the object mentioned in the question) to the plate. Otherwise, the FIGUREs are simply placed on the horizontal GROUND and no specific projective relation is indicated. Instead, a topological 'on'-relation is encoded by the postposition *k'e*.

In comparison, the European language speakers typically responded specifically to the location of the FIGURE, i.e., the cup, with respect to the plate as the immediate GROUND, rarely mentioning the larger, more stationary table. Some of the Norwegian and English speakers profiled the FIGURE being in a relative frame of reference, i.e., the FIGURE is to the right of the plate. The viewer is the focal point here.

The schemata 20 and 21 below show the differences between the typical Dene response pattern (topological spatial relation) and typical German, Norwegian, and English responses (projective relation).

Schema 20: Composite FIGUREs in 'on'-relation to horizontal GROUND (33a)

Schema 20 indicates the static topological 'on'-relation in the FIGURE/GROUND asymmetry. All Dene speakers profiled all of the participants and encoded the FIGURE and GROUND. As opposed to this non-specific encoding pattern, Schema 21 below presents the instantiated relative frame of reference in German, Norwegian and English.



Schema 21: FIGURE in static projective relation to horizontal GROUND (33b-d)

Schema 21 presents the projective orientation of the FIGURE instantiated by a relative frame of reference. The speaker aligns the participants of the scene in a lateral axis—as indicated by the line between the face and the GROUND—using his/her human body as the anchorage. The locative marker 'beside' or else 'to the right of' encodes the relative frame of reference and specifies the FIGURE's relation to the GROUND in a sideways alignment.

This example is interesting if contrasted to the following situation in which a similar FIGURE/GROUND asymmetry is profiled. The FIGURE is now an open container filled with liquid. This information might influence the instantiation of the FIGURE with respect to the GROUND, at least for some of the Dene speakers.

GLASS BESIDE/TO LEFT OF PLATE
Prompt: *Where is the glass?*

(34) a.	GND	LOC	FIG	DEIC+POST[FIG]	Dene
	tth'aíkalé	*gáh*	*tue*	*da-the-ka*	
	plate	beside	water	up-IMPF.3sg.S-OC.exist/lie(with liquid)	

'The open container filled with water is beside the plate.'[56]

b.	FIG$_1$		FIG$_2$	GND	LOC	DEIC+POST[FIG]	Dene
	tth'aíkálé	*tthi*	*tue*	*bek'eshélyi*	*k'e*	*da-the-la*	
	plate	and	water	table	on	up-IMPF.3sg.S-PO.exist/lie	

'The plate and water (plural objects) are on the table.'

c.		FIG	POST	LOC		GND$_1$	(GND$_2$)	German
	Das	*Glas*	*steht*	*auf*	*dem*	*Tisch*	*(neben dem Teller).*	
	the	glass	3sg.S.IMPF.stand	on	the	table	(beside.the.plate)	

'The glass stands on the table (beside the plate).'

d.	FIG	POST	LOC	GND	Norwegian
	Glass-et	*står*	*på*	*bord-et*	
	glass-the	3sg.S.IMPF.stand	on	table-the	

'The glass stands on the table.'

e.		FIG	EXIST/POST	LOC	GND$_1$	(GND$_2$)	English
	The	*glass*	*is/stands*	*beside the*	*plate*	*(on a table).*	
	the	glass	3sg.S.IMPF.be/stand	beside the	plate	(on.the.table)	

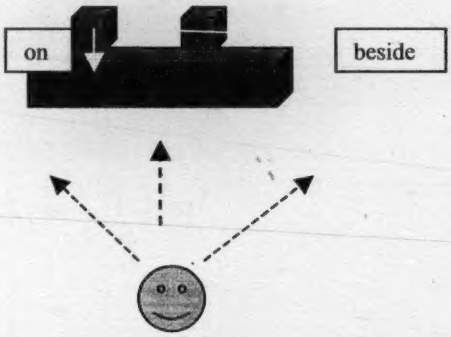
'The glass is/stands beside the plate (on a table).'

The example in (34a) specifies the FIGURE being an open container containing liquid. A different stem is used as opposed to the example above in which the various FIGUREs are only summarized, but not specified in terms of the quality. Hence, the Dene language marks a difference between a container that does not contain anything and a container that does contain something like liquid. Additionally, a relative (but non-specific) frame of reference is profiled by the postposition *gah* 'beside'. In the second Dene example, the same plural classificatory verb stem is used as in example 33 above. It profiles a plural object. Nevertheless, Dene speakers consistently prefer the verb stem expressing the open container with content.

---

[56] The stem *-ka* encodes 'to handle liquid in a vessel'.

The European language speakers expressed the FIGURE via an existence or posture verb. German speakers tended to use a posture verb to relate the FIGURE to the horizontal surface in addition to the preposition *auf* 'on'. Roughly the same encoding scheme is found in the majority of Norwegian and to English responses. Some speakers relate the FIGURE, i.e., the glass, to the secondary FIGURE, i.e., the plate, both being on the horizontal GROUND. All examples, from Dene through to English, encode static relations. Additionally, some speakers profile a relative frame of reference followed by a topological relation. The abstract schema for this set is presented in Schema 22.



Schema 22: FIGUREs in static projective relation aligned to horizontal GROUND (34c+e)

Schema 22 presents two different relational alignments of the FIGURE. One is the simple topological 'on'-relation between the static FIGURE and the static, horizontal GROUND. The other is the instantiation of a projective relation of the primary FIGURE with respect to the secondary FIGURE, both located 'on' the horizontal surface. The viewer or construer—the face—imposes the FIGURE/GROUND projective alignment in a relative frame of reference.

The next set is actually similar to the former, but now a plural object is related to the GROUND, while no additional reference point is encoded.

POTATOES ON TABLE
Prompt: *Where are the potatoes?*

(35) a.	FIG	POST[FIG]					Dene
	labada	*the-la*					
	potatos	IMPF.3.pl.S-PO.exist/lie					
	'Potatos lie.'						

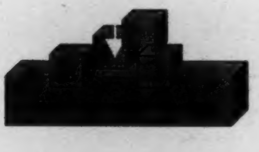
b.	FIG	GND	LOC	DEIC+ POST[FIG]			Dene
	labada	*bek'esh'ich'élyį́*	*k'e*	*da-the-la*			
	potatos	table	on	up-IMPF.3pl.S-PO.exist/lie			
	'(The) Potatos lie on the table.'						

c.		FIG	POST	LOC		GND	German
	Die	*Kartoffeln*	*liegen*	*auf*	*dem*	*Tisch.*	
	the	potatos	3pl.S.IMPF.lie	on	the	table	
	'The potatos lie on the table.'						

d.	FIG	EXIST/POST	LOC	GND			Norwegian
	Potet-er	*er/ligger*	*på*	*bord-et.*			
	potatos-the	3pl.S.IMPF.be/lie	on	table-the			
	'The potatos are/lie on the table.'						

e.	FIG	EXIST (POST)	LOC	(DOS)		GND	English
	Potatos	*are (lie)*	*on*	*(top of)*	*the*	*table.*	
	potatos	3pl.S.IMPF.lie	on	(top of)	the	table	
	'The potatos are/lie on top of the table.'						

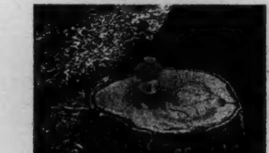
In all examples, the FIGURE is simply aligned to the horizontal GROUND in a general orientation. Example (a) is different from the other four in that no locative marker encodes a topological static relation. The FIGURE is profiled by means of the cohort system inferring a topological relation by the posture verb. The German set also presents the usage of a posture verb but includes a locative marker. All five examples do not impose any perspective. Schema 23 presents the representation of the involved participants.



Schema 23: Plural FIGURE located 'on' horizontal GROUND (35a-e)

The plural FIGUREs are aligned to the horizontal GROUND in a static fashion. European as well as some Dene speakers express this relation by an existence or posture verb cohort, other Dene speakers by the classificatory verb system in Dene (a). All results except (a) use a locative marker aligned with the verb system to encode a static topological spatial relation. In (a), only a general orientation of the plural FIGURE is encoded.

Another plural object encoding is presented in the next example. The FIGURES—the stones—are aligned vertically to the GROUND—the tree stump. We see that it is at least as much a topological relation that is at focus for Dene speakers as the degree of specificity, the exact number of objects, and the perspective.



STONES ON STUMP (PILED UP)

Prompt: Where are the stones?

(36) a.

GND	LOC	FIG	DEIC+ POST[FIG]	Dene
dechen	*k'e*	*tthe*	*da-the-la*	
stump	on	stone	up-IMPF.3.pl.S-PO.exist/lie	

'Stones lie up on the stump.'

b.

FIG	MNR	LOC+DOS	DEIC+POST[FIG]	Dene
tthe	*dįh*	*nizi*	*da-the-la*	
stone	four.times	in.presence.of/close.proximity	up-IMPF.3pl.S-PO.exist/lie	

'Four stones lie up close to each other.'

c.

	FIG	EXIST	DOS+LOC	LOC	German
Die	*Steine*	*sind*	*übereinander*	*aufgetürmt.*	

the stones 3pl.S.IMPF.be above.each.other piled.up
'The stones are piled up above each other.'

d. FIG EXIST/POST LOC GND Norwegian
Sten.er er/ligger på stubb.en.
stone.the 3pl.S.IMPF.be/lie on stump.the
'The stones are/lie on the stump.'

e. FIG EXIST(POST) LOC DOS LOC LOC GND English
The stones are (lying) above each other/piled up on the stump
the stones 3pl.S.IMPF.be/(lie) above each other/piled up
'The stones are (lying) above each other/piled up on a stump.'[57]

The examples show the range of encoding devices available to speakers for the purpose of encoding a FIGURE/GROUND asymmetry in Dene as well as in the European speakers' languages. The utterances in (36b,c) encode the close proximity of the FIGUREs to each other. The German expression gives even more precise information than the Dene one by encoding the exact position of the stones. Hence, in these examples it is not so much the general location of the FIGUREs on the horizontal GROUND, but the relation among the plural FIGUREs that is at stake here. This is to some extent also true for the English example in (36e), although here the horizontal GROUND is referred to as well.

The Dene example in (36a), however, presents only the general topological orientation of the FIGURE to the GROUND. The plural FIGURE is in a static topological relation to the GROUND (note that a plural FIGURE is encoded by the verb stem and is not a round object, i.e., the number instead of the shape is at focus).

The general location is profiled by the verbal cohort, even in German, Norwegian, and English. The cohort specifies the topological vertical alignment. By contrast, Dene presents a subtle difference in the encoding of the general orientation of the participants and the degree of specificity in which the FIGUREs are related. In the European examples, this variety is rather limited. Schema 24 indicates the internal vertical alignment of the FIGUREs to each other and to the GROUND as expressed in (36e).

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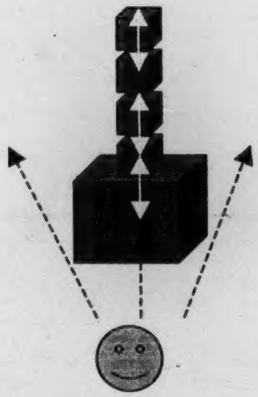
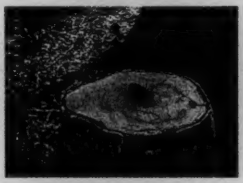
[57] Note that the majority of English speakers described only the relationship between the stones and the stump, i.e.,'the stones are on the stump'.



Schema 24: FIGURE aligned to and piled up on horizontal GROUND (36e)

Most speakers mention the 'piled up' orientation. Speakers infuse the description of the scene with information about how the complex FIGURE relates to itself.

The next set uses a similar FIGURE, only here it is a singular one. I want to present the examples simply because of the degree of specificity. In one Dene example, the FIGURE is profiled as being of a specific size and also on a specific GROUND. This is a clear difference from German and English.



STONE ON STUMP
Prompt: *Where is the stone?*

(37) a. Dene

GND	LOC	FIG	DEIC+ POST[FIG]
dechen	*k'e*	*tthe*	*da-the-ʔą*
wood	on	stone	up-IMPF.3sg.S-RO.lie

'The stone lies up on the wood.'

b. Dene

FIG		FIG	GND	GND	LOC	DEIC+POST[FIG]
tthe	*aze*	*tthe*	*delk'ozaze*	*xás*	*k'e*	*da-the-ʔą*
stone	small	stone	bark.small	stump	on	up-IMPF.3sgS-RO.lie.exists/lie

'A small stone lies up on a small stump.'

c.		FIG	POST	LOC		GND	German
	Ein	*Stein*	*liegt*	*auf*	*einem*	*Baumstumpf.*	
	a	stone	3sg.S.IMPF.lie	on	a	tree.trunk	

‘A stone lies on a tree trunk.’

d.	FIG	EXIST	LOC	GND	Norwegian
	Sten-en	*er*	*på*	*trestubb-en.*	
	stone-the	3sg.S.IMPF.be	on	tree.trunk-the	

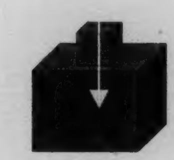
‘The stone is on the trunk.’

e.		FIG	EXIST/POST	LOC		GND	English
	The	*stone*	*is/lies*	*on*	*the*	*stump.*	
	the	stone	3sg.S.IMPF.be/lie	on	the	stump	

‘The stone is/lies on the stump.’

In (b), the sizes of FIGURE and GROUND are specified, hence, the additional information indicates some language- or culture-specific affordances to encode the full grammatical paradigm.

The German, Norwegian and English examples as well as the Dene example in (37a) only encode the general location of the FIGURE aligned to the GROUND. Schema 25 presents the FIGURE/GROUND alignment of the involved participants.



Schema 25: FIGURE in topological ‘on’-relation (37)

Schema 25 simply presents the singular FIGURE in a static topological relation to the GROUND. Neither of the participants is in motion.

The next set varies in terms of the relation of the FIGUREs to each other as well as in terms of the GROUND. The FIGUREs are basically placed in a line on the grass along the sand or beach.

ROCKS ON GROUND (VERTICAL AXIS/HEADLONG)
Prompt: *Where are the rocks?*

(38) a. Dene

LOC	FIG	POST[FIG]
tąmbąe	*tthe*	*dá-the-la*
along.the.shore	stone	3pl.S.IMPF-POexist/lie

‘Stones lie along the beach.’

b. German

	FIG	EXIST/POST	LOC	GND
Die	*Felsen*	*sind/liegen*	*am*	*Strand.*
the	rocks	3pl.S.IMPF.be/lie	on.the	beach

‘The rocks are/lie on the beach.’

c. Norwegian

FIG	EXIST/POST	LOC	GND
Fjell-ene	*er/ligger*	*på*	*strand-en.*
rocks-the	3pl.S.IMPF.be/lie	on	beach-the

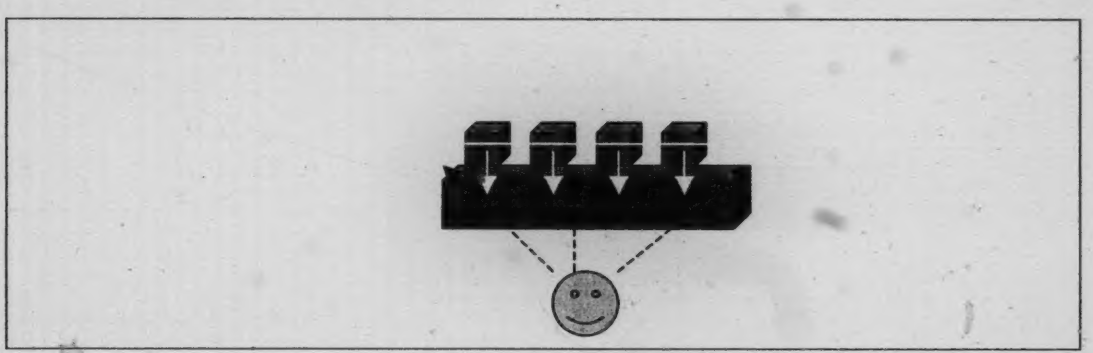
‘The rocks are/lie on the beach.

d. English

FIG	EXIST	LOC	GND
The rocks	*are*	*on the*	*beach.*
the rocks	3pl.S.IMPF:be	on the	beach

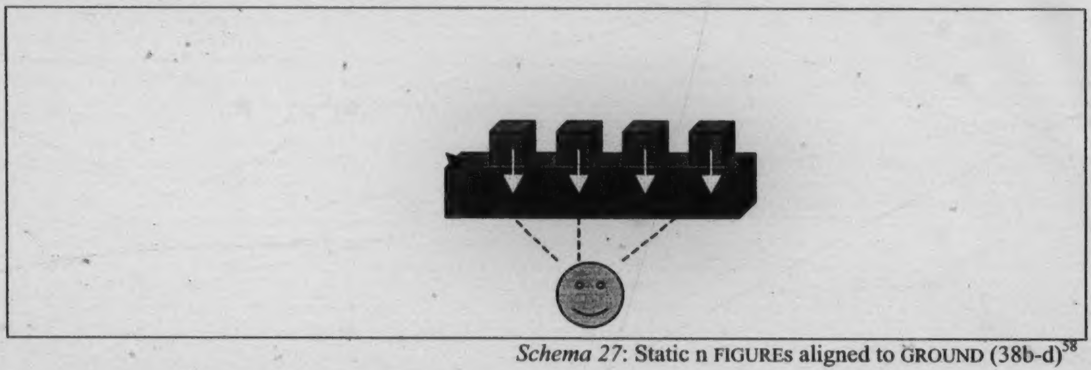
‘The rocks are on the beach.’

The example in (a) presents the FIGURE being placed on the shore. What is at stake here is a projective cohort in addition to the general orientation. This is profiled by the verb stem in addition to prefixes that determine the FIGURE’s orientation. This orientation is related to the secondary GROUND, the shoreline, rather than to the primary GROUND, the ground itself. Schema 26 presents this relation.



Schema 26: Static n FIGUREs aligned to GROUND (38a)

Schema 26 presents the various participants aligned along or parallel to the GROUND. This is indicated by the red boxes being at the edge of the green box as well as by the yellow arrow that is parallel to the horizontal GROUND, indicating an 'along' relation. This schema is different from the European results as presented in Schema 27 below.



Schema 27: Static n FIGUREs aligned to GROUND (38b-d)[58]

Especially the English and Norwegian speakers locate the FIGURE on the GROUND in a static and topological 'on'-relation. This is indicated by the red boxes being not on the edge of the green box, but directly on it. However, it should be noted here that German speakers use the dative prepositional phrase *am (an dem) Strand* which expresses something like the English 'along'. Hence, the German results can also be called similar to the Dene answer above.

In the next set, the distance of the FIGURE to the GROUND is manipulated as well as the distance of the viewer to the scene.

ROCKS ALONG COAST LINE (PROXIMAL)
Prompt: *Where are the rocks?*

(39) a.	LOC+DOS+GND	FIG	POST[FIG]	Dene
	tabǫ́é	*tthecho*	*dá-the-la*	
	near.shore.line	rock	3pl.S.IMPF-PO.exist/lie	

'The rocks lie near the shore line.'[59]

---

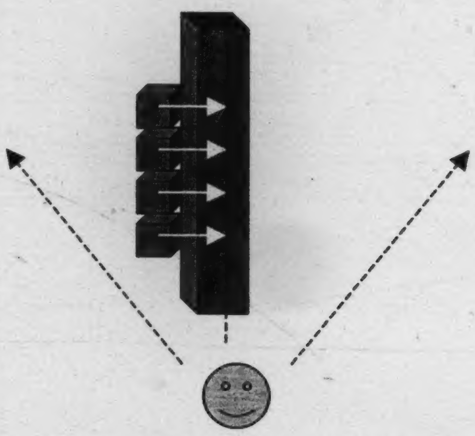
[58] The letter n represents an indefinite number of FIGURES.

b. FIG EXIST/POST DOS+MNR LOC GND German
Mehrere Felsen sind/liegen aufgereiht am Strand.
some rocks 3pl.S.IMPF.lie lined.up on.the beach
'Some rocks lie lined up on the beach.'

c. FIG EXIST LOC GND Norwegian
Fjell-ene er på strand-en.
rocks-the 3sg.S.IMPF.be on beach-the
'The rocks are on the beach.'

d. FIG EXIST LOC GND English
The rocks are on the beach.
the rocks 3pl.S.IMPF.be on the beach
'The rocks are on the beach.'

The Dene example in (a) profiles the close vicinity of the FIGURES to the GROUND. The preposition 'near' may also encode a topological relation, relating the FIGURES to the shoreline.



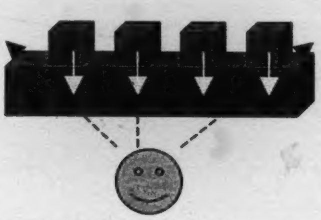
Schema 28: Static n FIGUREs aligned to GROUND: Projective relation (39 a-b)

Schema 28 shows the plural FIGURE aligned to the beach in a projective relation, i.e. 'near' or, as in the German example 'lined up'.

In Norwegian and English, the general orientation of the FIGURE is encoded. It is encoded by an existence marker or a posture verb and a locative marker. In these languages, a topological 'on'-relation is profiled. Schema 29 presents the abstract schema of the topological relation.

---

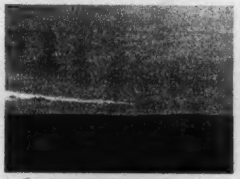
[59] The distributive prefix *dá-* encodes the plurality of the subject or object. It can also be used adverbially (Li 1946: 417).



Schema 29: Static n FIGUREs aligned to GROUND: The European languages (39 c-d)

Schema 29 presents the FIGURES being placed in a static topological relation to the horizontal static GROUND.

The next set presents the same FIGURE, but now I have manipulated the distance of the viewer to the FIGURE and GROUND as well as the distance between the FIGURE and the GROUND.



ROCK IN WATER (DISTAL)
Prompt: *Where is the rock?*

(40) a. Dene

GND	FIG	POST[FIG]
tué	*tthechogh*	*the-ʔą*
water	rock	IMPF.3sg.S-RO.exist/lie

‘The rock is/lies (in) the water.’

b. Dene

FIG	LOC+DOS	POST[FIG]
tthe	*tajághe*	*the-ʔą*
rock	lake(in.the.middle.of)	IMPF.3sg.S-RO.exist/lie

‘A rock is/lies in the middle of the lake’

c. Dene

DOS	GND	LOC	FIG	POST[FIG]
yatthę́	*tué*	*k'e*	*tthe*	*the-ʔą*
north	water	on	rock	IMPF.3sg.S-RO.exist/lie

‘The rock lies north on the water.’

d. German

	FIG	EXIST	LOC	GND
Der	*Felsen*	*ist*	*im*	*Wasser.*
the	rock	3sg.S.IMPF.be	in.the	water

‘The rock is in the water.’

e. FIG EXIST LOC GND Norwegian
Fjell-et er i vann-et.
rock-the 3sg.S.IMPF.be in water-the
'The rock is in the water.'

f. FIG EXIST LOC GND English
The rock is in the water.
the rock 3sg.S.IMPF.be in the water
'The rock is in the water.'

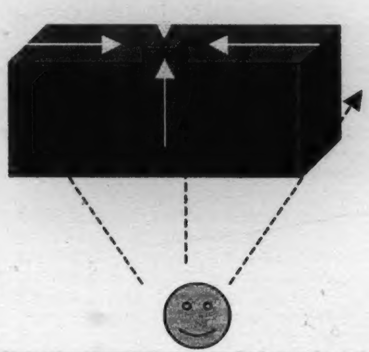
In (40a), the spatial scope of the FIGURE/GROUND asymmetry is specified as being in a neutral orientation. No locative marker expresses the FIGURE being 'in'. The FIGURE just lies or exists. This is different from example (40b) in which the FIGURE is profiled with a certain degree of specificity in relation to the GROUND. This relation depends on the viewer's perspective. Hence, the FIGURE is now 'in the middle of' the GROUND. The 'in' relation is not encoded by a locative marker, but rather inferred. The SCOPE is based on the distal perspective of the viewer, i.e., 'in the middle of' indicates a specific location of the FIGURE to the GROUND. In other words, the viewer is far away enough to locate the FIGURE being in the middle of the lake, which is usually a comparatively large GROUND.

Schema 30 presents schematically the general location of the FIGURE being 'in' the GROUND.

Schema 30: FIGURE in GROUND (40a,d-f)

The schema for the Dene sentence (40a) as well as for the European utterances in (40d-f) presents the static location of the FIGURE 'in' the GROUND. The static relation is marked with the yellow arrow. The distance of the FIGURE with respect to the viewer does not matter as opposed to the Dene examples an (40b-c). Again, Dene seems to leave open more alternatives to profile the FIGURE/GROUND asymmetry. Hence, the FIGURE is not described only in a topological relationship to the GROUND, but also expressed with a certain lateral perspective and degree of specificity. European speakers did not give me alternative results, they behaved consistent throughout the test.

Schema 31 presents the FIGURE being located with a certain degree of specificity to the GROUND as in (40b).



Schema 31: FIGURE located distal from viewer (40b)

Schema 31 for sentence (40b) presents the FIGURE's alignment in the middle of the GROUND as indicated by the four focusing yellow arrows. The viewer is in a certain distance to the FIGURE and hence the FIGURE/GROUND alignment is limited by the viewer's scope.

Finally, Dene example (40c) encodes the relation of the FIGURE to the GROUND by using the cardinal system, i.e., an absolute frame of reference. Not only the topological relation is at focus here, but also the specific location of the FIGURE. The FIGURE is aligned to the viewer in a lateral axis expressing a certain cardinal direction. This might be due to the fact that the Dene speakers who used this expression recognized the displayed scene as being on the southern shore of Cold Lake. The north alignment also implies a distal perspective. Again, the researcher's question was simply "Where is object X?", i.e., I left any additional semantic information up the speaker, including any information regarding the FIGURE's distance from the viewer.

So far, I have presented various situations in which objects have been manipulated minimally in terms of perspective and FIGURE/GROUND alignments. Dene seems to give more freedom in the choice of profiling the FIGURE/GROUND relationship as opposed to the choices European speakers have. Some of the presumed static relations have been encoded as dynamic in Dene. Besides, some of the examples profile various other relationships in addition to topological orientations. Additionally, FIGURE/GROUND reversals and certain degrees of specificity that differ from the European languages have been shown. The differences show nicely the language-specific morphosyntactic regulations that govern the speaker's behavior, but also the influence of extra-linguistic knowledge. This knowledge tends to be encoded by the Dene speakers and less so by the European ones. The speakers may also limit the scope of a scene. This is not so in the encoding of a topological relation in which the FIGURE is only related to the GROUND, but not with respect to the surrounding visual or perspective information.

The next section presents stick-like objects in various situations. Again, some subtle manipulations will be apparent that reveal the general cognitive semantics and its affordances in the encoding process.

5.3.2. Stick-Like Objects Coincident with GROUND-Relations

In this section, I present objects that are stick-like in different situations. I have used various objects in manipulated constellations. The aim is to elicit a range of perspectives in predominantly topological relations. In addition, I am interested in exploring how speakers limit the scope of the perspective and how they determine the general FIGURE/GROUND alignment.

The first picture presents a hatchet leaning against a tree stump. In other words, the FIGURE stands beside or to the right of the GROUND (relative frame of reference).

HATCHET BESIDE STUMP
Prompt: *Where is the hatchet?*

(41) a.	FIG	GND	LOC	DEIC+LOC+POST[FIG]	Dene
	tthę́ł	*k'ǫ́n*	*k'e*	*da-ni-nį-ʔą*	
	hatchet	stump	on	up-back.of/behind-[?]-IMPF.3sg.S-SO.lean.against	

'The hatchet leans up against/back of the stump.'[60]

---

[60] Among many other meanings the local and adverbia prefix *nį-* (nasalized [i]) encodes a terminative state as in 'arriving at' (= coming to its end point). It is also possible that the prefix is a postposed particle encoding past tense, or an event of thing in the past.

b.	GND	LOC	FIG	[?]+LOC+POST[FIG]	Dene
	kón	*k'ezį*	*tthęł*	*ná-nį-the-ʔą*	
	stump	over	hatchet	[?]-[?]IMPF.3sg.S-SO.lean.against[61]	

‘The hatchet leans against (on the other side of/over there) the stump.’

c.	FIG	GND	LOC	[?]+POST[FIG]	Dene
	tthęł	*dechen*	*gah*	*ná-ghe-tthí*	
	hatchet	wood	near/beside	[?]-IMPF.3sg.S-SO.stand.upright	

‘The hatchet stands (upright) near/beside the wood.’

d.		FIG	POST	LOC	GND	German
	Die	*Axt*	*steht/lehnt*	*neben dem*	*Baumstumpf.*	
	the	hatchet	3sg.S.IMPF.stand/lean	beside the	stump	

‘The hatchet stands/leans beside the stump.’

e.	FIG	EXIST/POST	LOC	LOC		GND	Norwegian
	Øks-en	*er/stand*	*på*	*siden*	*av*	*trestubb-en*	
	hatchet-the	3sg.S.IMPF.be/stand	on	side	of	tree.trunk-the	

‘The hatchet is/stands on the side of the tree trunk.’

f.		FIG	POST/EXIST	LOC		GND	English
	The	*axe*	*leans/is*	*beside(to the right of)*	*the*	*stump.*	
	the	axe	3sg.S.IMPF.lean/be	beside	the	stump	

‘The axe leans/is beside (to the right of) the stump.’

The posture verb ‘stand’ used in (41c-e) profiles the vertical alignment of the FIGURE to the ground; the relation between the hatchet and the stump is either encoded as parallel and unattached (standing beside) or parallel and partly attached (leaning against). The former expression encodes a projective relation. Examples (c-f) present a relative frame of reference, i.e., the viewer’s perspective is at stake here. Example (b) may differ from this, because it presents the relation of the FIGURE being ‘on the other side of’ the GROUND. Since from the viewer’s perspective, the hatched stands beside rather than on the other side of the stump, this may indicate an intrinsic frame of reference instead of a relative one. Another possibility, however, would be that the locative marker simply means ‘over there’ and would then imply deictic information.

Schema 32 presents the intrinsic frame of reference, and Schema 33 the relative frame. The former frame depends on the internal qualities of the object.

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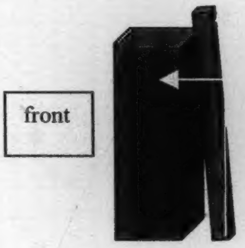
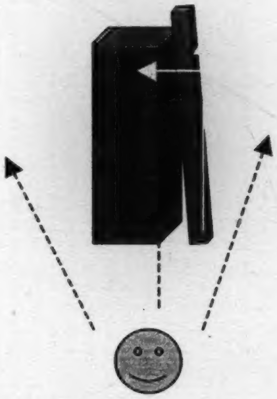
[61] The prefix *ná-* requires the continuative stem, e.g., *-ʔą* as in *nághįʔa* ‘it’s standing upright’.



Schema 32: Intrinsic frame of reference: FIGURE aligned to GROUND (41b)

In Schema 32, the yellow arrows in combination with the information about where the front of the stump is presents the 'upright' position of the FIGURE and the 'on the other side of'-relationship between the FIGURE and the GROUND based on an intrinsic reference frame. The viewer does not anchor the alignment to her/his body, but extracts the logical relationship from the objects to be related.



Schema 33: Relative frame of reference: FIGURE aligned to GROUND (41c-f)

The viewer here serves as the reference point to align the FIGURE in a projective relation to the GROUND. Hence, a relative frame of reference is invoked. This FIGURE/GROUND relation holds for the Dene example in (41c) as well as for the European speakers.

The next set presents the same FIGURE in a slightly different relation to the GROUND. If perceived in a relative frame of reference, as the German, Norwegian and English speakers do, the hatchet is now in front of the stump.

HATCHET IN FRONT OF STUMP
Prompt: *Where is the hatchet?*

(42) a. Dene

FIG	GND	LOC	DEIC+POST[FIG]
tthę́ł	*k'ǫ́n*	*k'e*	*da-ni-nį-ʔą*
hatchet	stump	on	up-[?]-[?]IMPF.3sg.S-SO.lean.against.it

'The hatchet leans up against (on) the stump.'

b. Dene

GND	FIG	LOC	POST[FIG]
tthęł	*dechen*	*ʔuzí*	*the-tą*
hatchet	wood	on.the.other.side	IMPF.3sg.S-SO.exist/lie

'The wood is/lies on the other side of the hatchet.'

c. German

	FIG	POST	LOC		GND
Die	*Axt*	*steht*	*vor*	*dem*	*Baumstumpf.*
the	hatchet	3sg.S.IMPF.stand	in.front.of	the	stump

'The hatchet stands in front of the stump.'

d. Norwegian

FIG	EXIST/POST	LOC	GND
Øks-en	*er/stand*	*foran*	*trestubb-en*
hatchet-the	3sg.S.IMPF.be/stand	on	tree.trunk-the

'The hatchet is/stands in front of the tree trunk.'

e. English

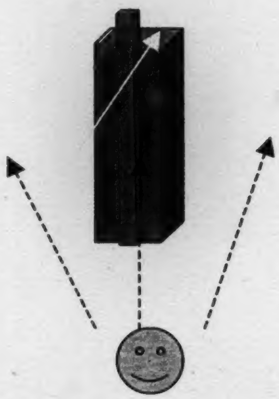
	FIG	EXIST/POST	LOC		GND
The	*hatchet*	*is/stands*	*in.front.of*	*the*	*stump.*
the	hatchet	3sg.S.IMPF.be/stand	in.front.of	the	stump

'The hatchet is/stands in front of the stump.'

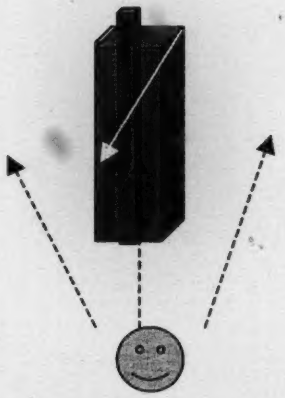
The Dene example in (42a) presents the orientation of the FIGURE being in a partly attached relation (leaning against) to the vertical GROUND. The location of the FIGURE is not specified with regard to the viewer's perspective. In the European examples (42c-e), the FIGURE is encoded as being in an upright (standing) position by the use of a posture verb. It is also described as being in an 'in front of'-relation to the GROUND. In other words, the European examples are encoded on the basis of a relative reference frame, with a frontal axis between the viewer and the objects to be encoded. The Dene example in (42b), however, indicates a FIGURE/GROUND reversal again. The stump is now the

FIGURE, whereas the hatchet is the GROUND: The verb stem indicates that the stump lies behind ('on the other side') the hatchet. Hence, here the first object serves as the reference point. As in the European examples, there is a relative reference frame to be seen here.

Schema 34 (next page) presents the relative frame of reference (42c-e).



Schema 34: Relative frame of reference: FIGURE aligned to GROUND (42c-e)



Schema 35: Relative frame of reference: FIGURE/GROUND reversal (42b)

In Schema 35, the FIGURE/GROUND relation is reversed, hence, the larger entity is now the FIGURE, and the smaller entity is the GROUND.

In the next examples (page 121), the FIGURE is in a projective relation being 'behind' the GROUND, at least when a relative frame of reference is profiled.

HATCHET BEHIND STUMP
Prompt: *Where is the hatchet?*

(43) a. Dene

FIG	GND	LOC	DEIC+LOC+POST[FIG]
tthę́ł	*k’ǫ́n*	*ʔuzį*	*da-ni-nį-ʔą*
hatchet	stump	on.the.other.side	up-back.of/behind-[?]IMPF.3sg.S-SO.lean.against.it

‘The hatchet leans up against (back.of) the stump (on the other side).’

b. Dene

GND	LOC	LOC	FIG	DEIC+LOC+POST[FIG]
kǫ́n	*ghą*	*k’edhe*	*tthęł*	*da-ni-nį-ʔą*
stump	near/close/beside	alongside	hatchet	up-back.of/behind-[?]IMPF.3sg.S-SO.lean.against.it

‘The hatchet leans up against beside/alongside (back.of) the stump.’

c. Dene

DEIC	FIG	GND	[?]+LOC+POST[FIG]
eyer	*tthęł*	*kǫ́n*	*na-ghe-tthi*
there(medial)	hatchet	stump	[?]-IMPF.3sg.S-SO.stand.upright

‘There stands a hatchet (by/at) the stump.’

d. German

	FIG	EXIST/POST	LOC		GND
Die	*Axt*	*ist/steht*	*hinter*	*dem*	*Baumstamm.*
the	hatchet	3sg.S.IMPF.be/stand	behind	the	stump

‘The hatchet stands behind the stump.’

e. Norwegian

FIG	EXIST/POST	LOC	LOC	GND
Øks-en	*er/stand*	*bak*	*av*	*trestubb-en*
hatchet-the	3sg.S.IMPF.be/stand	back	of	tree.trunk-the

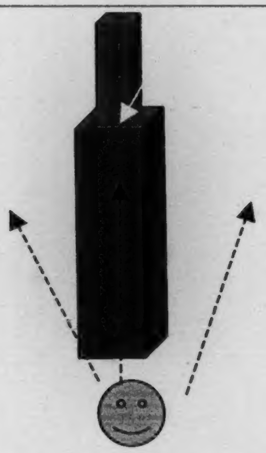
‘The hatchet is/stands behind the tree trunk.’

f. English

	FIG	EXIST/POST	LOC		GND
The	*hatchet*	*is/stands*	*behind*	*the*	*stump.*
the	hatchet	3sg.S.IMPF.stand	behind	the	stump

‘The hatchet is/stands behind the stump.’

Whereas in (43c), only a general topological relation between figure and ground is encoded, in (a), the FIGURE is aligned in a frontal axis to the speaker’s perspective by means of the postposition meaning ‘on the other side’. Hence, a relative frame of reference is profiled. The European examples encode this relation by means of a locative meaning ‘behind’, hence also profiling a relative reference frame. In all examples, the position of the FIGURE as being in an upright position is encoded. In (b), however, quite similar to the example in (41b), a different frame of reference seems to be instantiated, indicating a ‘beside’ or ‘alongside’ relation between FIGURE and GROUND. Schema 36 presents the relative frame of reference of the FIGURE/GROUND alignment as in example (a,.d-f).



Schema 36: Relative frame of reference: FIGURE behind GROUND (43)

The viewer aligns the FIGURE/GROUND asymmetry with respect to the frontal axis instantiated by the relative frame of reference. The yellow arrow indicates the 'behind'-relationship.

The next set uses a different FIGURE. A bottle is placed on a stump in a standing position.

BOTTLE ON STUMP (STANDING)
Prompt: *Where is the bottle?*

(44) a.	FIG	GND	LOC	[?]+LOC+POST[FIG]	Dene
	tutili	*dechęn*	*k'e*	*na-ghį-ʔą*	
	bottle	stump	on	in.place.of[?]-IMPF.3sg.S-SO.stand.upright	

'The bottle stands on the stump.'

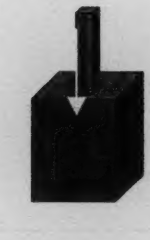
b.		FIG	POST/EXIST	LOC		GND	German
	Die	*Flasche*	*steht/ist*	*auf*	*dem*	*Baumstamm.*	
	the	bottle	3sg.S.IMPF.stand/be	on	the	tree.trunk	

'The bottle stands/is on the tree trunk.'

c. FIG EXIST/POST LOC GND Norwegian
Flask-en er/står på stubb-en.
bottle-the 3sg.S.IMPF.be/stand on stump-the
'The bottle is/stands on the stump.'

d. FIG EXIST LOC GND English
The bottle is on the stump.
the bottle 3sg.S.IMPF.be on the stump
'The bottles is on the stump.'

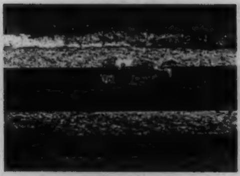
All examples encode the FIGURE being in a static topological relation to the GROUND. The European speakers use an existence or posture predicate and the Dene speakers a classificatory verb system. Schema 37 presents the FIGURE/GROUND asymmetry profiled in (44).



Schema 37: Vertically elongated object on GROUND (44)

Schema 37 presents the 'on'-alignment of the FIGURE with respect to the horizontal surface.

The next set uses the same FIGURE, but now its orientation is in a parallel, fully attached relation to the horizontal GROUND and the distance between viewer and scene is changed.



BOTTLE ON TABLE (PROXIMAL)
Prompt: *Where is the bottle?*

(45) a. Dene

FIG	GND	LOC	DEIC+POST[FIG]
tutili	*bek'eshich'elyį*	*k'e*	*da-the-tą*
bottle	table	on	up-IMPF.3sg.S-SO.exist/lie

‘The bottle is/lies up on the table.’

b. Dene

FIG	GND	LOC	[?]+LOC+POST[FIG]
tutilaze	*bek'eshich'elyį*	*k'e*	*ná-ghį-tą*
bottle	table	on	in.place.of[?]-IMPF.3sg.S-SO.exist/lie

‘The bottle is/lies on the table.’

c. German

	FIG	POST	LOC		GND
Die	*Flasche*	*liegt*	*auf*	*dem*	*Tisch.*
the	bottle	3sg.S.IMPF.lie	on	the	table

‘The bottle lies on the table.’

d. Norwegian

FIG	EXIST/POST	LOC	GND
Flask-en	*er/ligger*	*på*	*bord-et.*
bottle-the	3sg.S.IMPF.lie	on	table-the

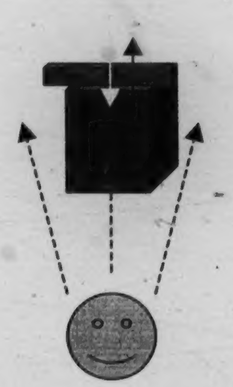
‘The bottle lies on the table.’

e. English

	FIG	EXIST	LOC		GND
The	*bottle*	*is*	*on*	*the*	*table.*
the	bottle	3sg.S.IMPF.be	on	the	table

‘The bottle is on the table.’

All examples encode the FIGURE as being in an ‘on’-relation to the horizontal GROUND. All examples except the English one do it be means of a posture verb and a locative. Moreover, the Dene example in (45a) specifies the location of the reference object (and the FIGURE) as being in a certain elevated position to the ground by means of the deictic marker *da-*. This Dene utterance is presented in a schematized way in Schema 38.



Schema 38: FIGURE aligned to elevated GROUND (45a)

Schema 38 presents the topological alignment between the FIGURE and the GROUND. The FIGURE is in a coincident relationship with the GROUND. The scheme shows also that the GROUND is in an elevated position by means of the solid black arrow indicating the deictic marker 'up'. The European speakers encode a similar topological relationship, but without the specification that the FIGURE/GROUND relation is in a certain 'up'-position with regard to the ground or viewer.

The next set differs in terms of the GROUND's height. As opposed to the table forcing the FIGURE to be in a certain elevated position, now the earth or soil is the GROUND.

BOTTLE ON GROUND (DISTAL)
Prompt: *Where is the bottle?*

(46) a. FIG GND LOC POST[FIG] — Dene
tutili tthai k'e the-tą
bottle sand on IMPF.3sg.S-SO.exist/lie
'The bottle is/lies on the sand.'

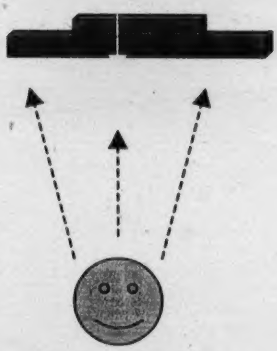
b. FIG GND+LOC POST[FIG] — Dene
tuteli nihk'e the-tą
bottle ground.on IMPF.3sg.S-SO.exist/lie
'The bottle is/lies on the ground.'

c. FIG EXIST/POST LOC GND — German
Die Flasche ist/liegt auf dem Boden.
the bottle 3sg.S.IMPF.be/lie on the ground
'The bottle is/lies on the ground.'

d. FIG EXIST/POST LOC GND — Norwegian
Flask-en er/ligger på grunn-en
bottle-the 3sg.S.IMPF.be/lie on the ground-the
'The bottle is/lies on the ground.'

e. FIG EXIST/POST LOC GND — English
The bottle is/lies on the ground.
the bottle 3sg.S.IMPF.be/lie on the ground
'The bottle is/lies on the ground.'

The Dene responses are similar to the European results in that in all of the responses, the FIGURE is aligned to the horizontal GROUND in a static and topological relation. Note that the Dene speakers do not use the prefix *da-* as in the above example. As I have mentioned before, this prefix is used when the FIGURE is in a certain elevated position. Schema 39 presents a schematic representation of the speakers' expressions.



Schema 39: FIGURE horizontally aligned to non-elevated GROUND

The next set is only varying the FIGURE's orientation to the GROUND, i.e., an elevated orientation to the horizontal GROUND.

BOTTLE ON GROUND (STAND)
Prompt: *Where is the bottle?*

(47) a. FIG GND LOC [?]+LOC+POST[FIG] — Dene
tutili tthąi k'e ná-ghį-ʔa
bottle sand on in.place.of[?]-IMPF.3sg.S-SO.stand.upright[62]
'The bottle stands upright on the sand.'

b. FIG EXIST/POST LOC GND — German
Die Flasche ist/steht auf dem Boden.
the bottle 3sg.S.IMPF.be/stand on the ground
'The bottle is/stands on the ground.'

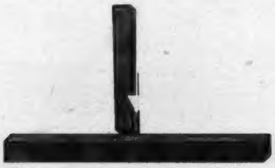
c. FIG EXIST/POST LOC GND — Norwegian
Flask-en er/står på sand-en.
bottle-the 3sg.S.IMPF.be/stand on sand-the
'The bottle is/stands on the sand.'

---

[62] The prefix *na-* has, as stated earlier, different meanings. It can express the the figure is 'in place of', 'across', 'in front of'. The prefix is also used as an iterative as in 'again', 'back again' or as a continuative as in 'here and there', 'about' (Li 1946: 417). I am hesitant to decide the exact meaning in this example and will use *na-* as 'in place of'.

d. FIG EXIST LOC GND English
The bottle is on the ground.
the bottle 3sg.S.IMPF.be on the ground
'The bottle is on the ground.'

In all examples, the FIGURE is vertically aligned to the horizontal GROUND, i.e., the bottle is in a static and topological relation 'standing' on the ground. Schema 40 presents this relationship.



Schema 40: FIGURE vertically aligned to GROUND (47)

The next set shows a dynamic event in addition to the spatial orientation of the FIGURE to the GROUND.

BOTTLE ON WATER
Prompt: *Where is the bottle?*

(48) a. FIG GND LOC POST+DYN[FIG] Dene
tutili tu k'e ghe-l-eł
bottle water on PRG.3sg.S-CL-SO.float
'The bottle is floating on water.'

b. FIG [?]+POST+DYN[FIG] GND Dene
tuteli na-ghe-beł tue
bottle [?]-PRG.3sg.S-swim water
'The bottle is swimming (on the) water.'

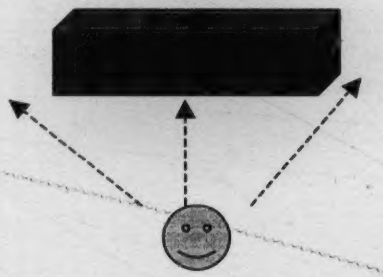
c. LOC+GND LOC FIG POST+DYN[FIG] Dene
tahetįhe k'e tuteli ghe-ʔuł
on.the.waves(empty container) on bottle PRG.3sg.S-SO.float
'The empty bottle is floating on the waves.'

d. FIG DYN LOC GND German
Die Flasche treibt auf dem Wasser.
the bottle 3sg.S.IMPF.float on the water
'The bottle floats on the water.'

e. FIG DYN LOC GND Norwegian
Flask-en svømmer på vann-et.
bottle-the 3sg.S.IMPF.swim on water-the
'The bottle swims on the water.'

f. FIG DYN LOC GND English
The bottle is on the water.
the bottle 3sg.S.IMPF.be on the water
'The bottle is on the water.'

In Dene, the FIGURE is in motion as it is in the European languages except English. This is indicated by a dynamic verb, meaning 'to float' or else 'to swim'. The difference is that in Dene, the locative marker is not used frequently: For ecample, it is left out in (48b). Here no locative marker expresses a topological relation. Indeed, speakers said that the expression in (48b) is sufficient to indicate that the FIGURE is moving on water. This may also be indicated by the prefix *na-* which can mean 'here and there', implying a movement. In (48c), Dene speakers profile the specific character of the GROUND being not only water, but also in motion by expressing it as waves. Schema 41 shows the dynamic FIGURE/GROUND relationship encoded in all languages except English (48f).



Schema 41: FIGURE in dynamic GROUND

The blue arrow indicates the motion of the FIGURE. In addition, the yellow arrow presents the FIGURE as being on the GROUND. In terms of the spatial relationship, I claim that it is only secondary. This can be supported by another situation in which a different FIGURE is in the liquid GROUND, i.e., water.

LOG IN WATER (FLOAT)
Prompt: *Where is the log?*

(49) a.

GND	LOC	FIG	POST+DYN[FIG]	Dene
ŧu	*k'e*	*dechęnkalé*	*ghe-l-eł*	
water	on	wood	PRG.3sg.S-CL-float	

'The wood is floating on water.'[63]

b.

FIG	[?]+POST+DYN[FIG]	Dene
dechen	*na-ghe-beł*	
wood	[?]-PRG.3sg.S-swim	

'The wood is swimming.'

c.

	FIG	DYN	LOC		GND	German
Das	*Brett*	*treibt*	*auf*	*dem*	*Wasser.*	
the	board	3sg.S.IMPF.float	on	the	water	

'The board floats on the water.'

d.

FIG	EXIST/DYN	LOC	GND	Norwegian
Brett-en	*er/svømmer*	*på*	*vann-et.*	
board-the	3sg.S.IMPF.be/swim	on	water-the	

'The board is/swims on the water.'

e.

	FIG	EXIST/DYN	LOC		GND	English
The	*board*	*is/floats*	*in*	*the*	*water.*	
the	board	3sg.S.IMPF.be/float	in	the	water	

'The board is/floats in the water.'

In the European languages, a locative marker is mandatory to profile the FIGURE in relation to the GROUND. In most examples, the figure moves in an uncontrolled manner, i.e., it floats or swims 'in' or 'on* the ground. In the Dene example in (49b), the dynamic event is primarily expressed while the FIGURE/GROUND relation is again inferred. The prefix *na-* here once again may indicate the movement of the FIGURE. The schema for this would thus be similar to the one above.

---

[63] The classifier *-l-* expresses passive, medio-passive, and reflexive. This classifier is derived from the *-ł-* class verbs (Li 1946: 411). It can be used as 'again'.

I want to end the section with a set of different positions of another FIGURE (or better FIGURES), i.e., posts lined up and shown from different perspecitves. I manipulated the perspective slightly from scene to scene, because I was interested whether this manipulation is expressed at all. In the background of the scene, the shore is visible. The first example presents the posts lined up in a diagonal fashion with respect to the viewer.

POSTS LINED UP (DIAGONAL)
Prompt: *Where are the posts?*

(50) a. Dene

GND	DOS+LOC	FIG	[?]POST+LOC[FIG]	DOS
tųlu ghá	*k'edhe*	*dechen*	*ná-da-t-the-ʔą*	*tabąghe*
side.road	alongside	wood	[?]-up-CL-IMPF.3pl.S-SO.stand	along.the.shore

‘The wood stands alongside the road along the shore.’

b. Dene

DOS+LOC	GND	FIG	[?]POST+LOC[FIG]
tabą́e	*tųlu ghá*	*dechen*	*ná-da-the-ʔą*
along.the.shore	side.road	wood	[?]-up-IMPF.3pl.S-SO.stand

‘The wood stands upright along the shore.’

c. German

	FIG	POST	DOS	LOC	LOC		GND
Die	*Pfähle*	*stehen*	*diagonal*	*aufgereiht*	*auf*	*dem*	*Boden.*
the	posts	3pl.S.IMPF.stand	diagonal	lined.up	on	the	ground

‘The posts stand diagonally lined up on the ground.’

d. Norwegian

FIG	POST	LOC	GND
Pæl-ene	*står*	*på*	*jord-en.*
posts-the	3pl.S.IMPF.stand	on	sand-the

‘The posts stand on the ground.’

e. English

	FIG	POST	LOC		GND
The	*posts*	*are*	*on*	*the*	*ground.*
the	posts	3pl.S.IMPF.be	on	the	ground

‘The posts are on the ground.’

Dene speakers express a high degree of specificity to align the plural FIGURES to the GROUND or rather with respect to the perspective. In (50a) the FIGURE is specified being positioned alongside the side road and the shore respectively. The FIGURES are in an upright position, and the orientation depends on the instantiation of the two reference points being (a) the road, and (b) the shore. In German, there is also information about how the FIGUREs are positioned relative to the viewer's perspective and in relation to each other by means of describing their position as being diagonally lined up. The Norwegian and English speakers behave differently in that they relate the plural FIGURE to the GROUND in a more general fashion. They do not give as much background information to limit the SCOPE of the FIGURE/GROUND asymmetry. In Norwegian, it does not matter where the FIGUREs are located. It is enough information that they 'stand'. In the English example, there is not even this information, but a simple 'on'-relation between FIGUREs and GROUND. This is different in Dene. It is mandatory to provide the reference frame to limit the perspective of the FIGURE. Apparently the perspective is not crucial for the Norwegian and English speakers.

POSTS LINED UP (FRONTAL AXIS)
Prompt: *Where are the posts?*

(51) a. Dene

GND_1	LOC	DOS+LOC	FIG	DOS	GND_2	DOS+LOC
tųlu	*gha*	*k'edhe*	*dechę̨n*	*ełtth'i*	*tue*	*dzak'ezį*
side.road	near	alongside	wood	straight	water	out.on(lake/prairie/flat.surface)

'The wood (standing straight up) is alongside the side road out on the water.'

b. Dene

GND	FIG	[?]POST+LOC[FIG]
nų́k'e	*dechen*	*na-dá-the-ʔą*
island.on	wood	[?]-3pl.S.IMPF-SO.stand.against.it

'The wood stands upright on the island.'

c. German

	FIG	POST	DOS	DOS	LOC		GND
Die	*Pfähle*	*stehen*	*aufgereiht*	*hintereinander*	*auf*	*dem*	*Boden.*
the	posts	3pl.S.IMPF.stand	lined.up	behind.each.other	on	the	ground

'The posts stand lined up on the ground one behind the other.'

d. Norwegian

FIG	POST	LOC	GND
Pæl-ene	*står*	*på*	*jord-en.*
posts-the	3pl.S.IMPF.stand	on	sand-the

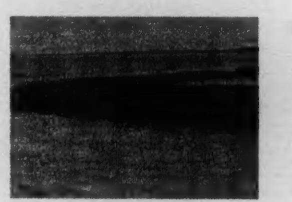
'The posts stand on the ground.'

e. English

	FIG	POST	DOS	LOC		GND
The	*posts*	*are*	*headlong*	*on*	*the*	*ground.*
the	posts	3pl.S.IMPF.be	headlong	on	the	ground

'The posts are headlong on the ground.'

Again, Dene speakers express the scope of the perceptual orientation in terms of the various reference points such as the side road and the 'alongside' location. It is also worth mentioning that Dene speakers specify that the FIGUREs are in an upright position with respect to the horizontal GROUND. This specificity decreases, if we want to impose a semantic hierarchy, from Dene to German, Norwegian, and finally English speakers. Again, if speakers were asked for a more specific description, they provided such a specification, but only when asked. Only Dene speakers frequently came up with the descriptions given above. These show very specific encoding patterns based on the morphosyntactic affordances of the language.



POSTS LINED UP (LATERAL)
Prompt: *Where are the posts?*

(52) a. FIG [?]LOC+POST[FIG] — Dene
dechen na-da-the-ʔą
wood [?]-up-3pl.S.IMPF-SO.stand.against.it
'The wood stands upright.'

b. GND FIG POST+LOC[FIG] — Dene
nų́k'e dechen na-da-the-ʔa
island.on wood [?]-up-3pl.S.IMPF-SO.stand.against.it
'The wood stands upright on the island.'

c. GND LOC GND+POST+LOC[FIG] — Dene
tue ts'ęn ne-l-ʔą
water towards [?]-CL-IMPF.SO.stand.against.it
'The posts stand towards the water.'

d. FIG POST DOS LOC GND — German
Die Pfähle stehen aufgereiht auf dem Boden.
the posts 3pl.S.IMPF.stand lined.up on the ground
'The posts stand lined up on the ground.'

e. FIG POST LOC GND — Norwegian
Pæl-ene står på jord-en.
posts-the 3pl.S.IMPF.stand on sand-the
'The posts stand on the ground.'

f.							English
		FIG	POST	LOC		DOS	
	The	*posts*	*are*	*lined*	*up*	*(sideways).*	
	the	posts	3pl.S.IMPF.be	lined	up	(sideways)	

‘The posts are lined up (sideways).’

In the first two Dene examples (52a-b), the speakers focus on the specific position or location of the FIGUREs rather than the perspective. The posts are located ‘standing upright (on the GROUND)’. In (52c), however, speakers profile the orientation of the FIGUREs with respect to a secondary GROUND as well, i.e., water serving as the background information here. The FIGUREs are aligned with respect to the water, heading towards it.

The Norwegian speakers only encode the very general orientation of the FIGURE standing on the GROUND. The posture verb expresses the vertical alignment of the FIGURE to the horizontal GROUND. The German utterances, however (52d), also encode the relationship between the FIGUREs as being ‘lined up’. In some of the English answers (52f), this is even more specified by the expression of the perspective of the viewer on the FIGUREs, i.e., they are positioned ‘sideways’.

This section presented a variety of FIGURE/GROUND relations as depicted in stimulus material that provided different perspective manipulations. Dene speakers provide more specific information as opposed to the European speakers. Especially the degree of specificity of the FIGURE’s alignment has been proven to be more relevant in Dene than in the European languages. Dene speakers encode specific information for morphosyntactic reasons. European speakers seem to be usually not that specific.

The final data sections conclude my description of the *SPACE* study. The next section presents human beings in a variety of static situations.

5.3.3. Human Beings in Different Situations: Static Situations and Different Distances

This section presents one or more human beings being located on or at a static GROUND. The first example presents a person sitting in front of a tree.

MAN IN FRONT OF THE TREE (SIT)
Prompt: *Where is the man?*

(53) a. Dene

FIG	GND	LOC	POST[FIG]
chelekwi	*k'es*	*t'azį*	*ne-dá*
young.man	poplar	leaning.against	IMPF.3sg.S-AO.sit.down

‘The young man sits downleaning against a poplar.’

b. Dene

GND	LOC	POST[FIG]		POST[FIG]
dechen	*k'ezį́*	*da-k'e-né-l-da*	*ú*	*na-the-da*
wood	behind	up-[?]-[?-]3sg.S.lean.against.it	while	[?]-3sg.S.PRG-AO.sit[64]

‘He leans against the wood (up) behind while sitting down.’

c. Dene

FIG	DYN+LOC		GND	LOC
Wayne	*nį-the-da*	*sį*	*dechen*	*gah*
Wayne	[?]-3sg.S.PRG-AO.sit.down	EMPH	wood	near

‘Wayne is sitting down near the wood.’

d. German

	FIG		LOC		GND
Der	*Mann*	*sitzt*	*vor*	*dem*	*Baum.*
the	man	3sg.S.IMPF.sit	in.front.of	the	tree

‘The man sits in front of the tree.’

e. Norwegian

FIG	POST	LOC	GND
Mann-en	*sitter*	*foran*	*tre-et.*
man-the	3sg.S.IMPF.sit	in.front.of	tree-the

‘The man sits in front of the tree.’

f. English

	FIG	POST	LOC			GND
The	*man*	*sits*	*in*	*front of*	*the*	*tree.*
the	man	3sg.S.IMPF.sit	in	front of	the	tree

‘The man sits in front of the tree.’

In the Dene examples, two different orientations are encoded. One is the general orientation of the person with respect to the ground, i.e., the person is sitting down on it. The other is the FIGURE's orientation towards the tree as GROUND. In (a-b), this is specified as a 'leaning against', i.e., an upright and partly attached relation between FIGURE and GROUND. In (53c), however, the relation between FIGURE and GROUND is encoded as one of proximity by means of a locative marker.

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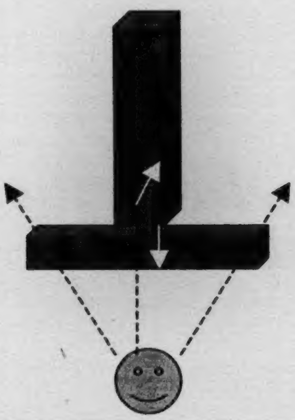
[64] Here the prefix *na-* encodes an active or momentary (‘to take a seat’) action (Cook 2004: 86).

All the European examples express the FIGURE's location by a posture verb and the projective relation marker 'in front of', i.e., the partly attached relation of the FIGURE to the vertical GROUND (the tree) is not profiled in the same way as it is in the Dene examples in (a-b). Instead, there is a relative reference frame used here. Schema 42 presents the schema for the encoding patterns across the languages.



Schema 42: Static FIGURE sitting 'in front of'/'leaning against' vertical GROUND

Schema 42 presents the simultaneous relations of the FIGURE's to the vertical GROUND—'the tree'—and to the horizontal GROUND—'the ground'. These relationships are indicated by the yellow arrows.

The next set presents three people standing on a rock in a certain distance to the viewer.

3 PEOPLE ON ROCK (STAND/PROXIMAL)
Prompt: *Where are the people (standing)?*

(54) a. Dene

DEIC+LOC	FIG	GND		LOC	[?]POST[FIG]
tąni	*dene*	*tthechogh*	*theʔąi*	*k'e*	*na-dé-ł-ya*
centre/middle	person	rock	face.someone.stand	on	[?]-IMPF.3pl.S-CL-AO.stand

'The people stand facing this man in the middle of the rock.'

b. Dene

DEIC+LOC	GND	LOC	[?]POST[FIG]
tąni	*tthe*	*k'e*	*na-da-de-ł-ya*
centre/middle	rock	on	[?]-up-IMPF.3pl.S-CL-AO.stand

'People stand up in the middle of a rock.'

d. German

	FIG	POST	LOC		GND
Die	*Leute*	*stehen*	*auf*	*dem*	*Felsen.*
the	people	3pl.S.IMPF.stand	on	the	rock

'The people stand on the rock.'

e. Norwegian

FIG	POST	LOC	GND
Mennesk-ene	*står*	*på*	*fjell-et.*
men-the	3pl.S.IMPF.stand	on	rock-the

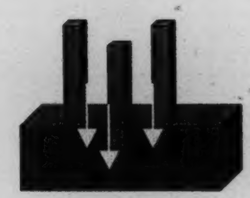
'The men stand on the rock.'

f. English

	FIG	POST	LOC		GND
The	*people*	*stand*	*on*	*the*	*rock.*
the	people	3pl.S.IMPF.stand	on	the	rock

'The men stand on the rock.'

The FIGUREs are aligned to the horizontal GROUND by the posture verb and the locative marker in all languages. However, the Dene speakers are more precise in locating the FIGUREs to the GROUND, not only in terms of the general vertical orientation to it, but also '(up) in the middle of' the rock (54a,b), facing the viewer (54a). Schema 43 presents only the general FIGURE/GROUND alignment as profiled by all speakers as shown in examples (54a-f).



Schema 43: People standing on static GROUND

5.4. General Discussion

In Dene, the scenes presented by the video clips of *SPACE* are often described based on the specific characteristics of the FIGURE being located in relation to the GROUND, depending on its texture, material, size, and shape. This simply means that the language forces the speaker to elaborate and exhaust the morphosyntactic affordances to encode the various FIGURE/GROUND asymmetries. In addition, the GROUND imposes certain interpretations; for example, water as the GROUND for a boat implies that the FIGURE cannot exist statically in its location. Therefore, the clips are described as contextualized situations. Contextualized here means the influence of extra-linguistic knowledge that is included in the description of the scene as additional information to specify the participants of a scene. This influence is mirrored by the various morphosyntactic paradigms a speaker can choose from. This is hence a confirmation of the *TRM* results that, although seemingly all over the place in terms of the Dene speaker's behaviors, reveal in retrospective some interesting notions on the language-specific affordances of Dene. *SPACE* presents more realistic data points and by that allows some insight into the intricacies of the language and its morphosyntax. These language-specific affordances force the speaker to express the various participants as the result of a certain perceptive input (as we have seen in the *TRM* study). As such, Dene tends not to reduce the semantic load. It is expressed as distributed semantics across an utterance. Moreover, we clearly see that naturalistic or even familiar settings prompt the speakers to give a range of paradigms encoding a variety of FIGURE/GROUND asymmetries, perspective information, and a high degree of specificity.

These observations lead to the assumption that Dene presents language-specific affordances deviating from the other languages under survey. Hence, Dene presents construal mechanisms that differ from the European languages. It can be speculated whether the cognitive entrenchment of the various FIGURE/GROUND asymmetries depends on those affordances.

As mentioned above, Dene speakers tend to encode 'spatial' relationships between FIGURE and GROUND objects through a cohort of morphosyntactic devices, including classificatory verbs, directional verb prefixes, and postpositions. If a locative marker is used, it only expresses generic information about the spatial relation between FIGURE and GROUND; in fact, when asked, speakers revealed that the locative marker can even be dropped. The nature and identity of the FIGURE is signaled through the classificatory verb stem plus a variety of tense/aspect, thematic, valency, and directional verb prefixes. Hence, the Dene verb system provides core information about the FIGURE and its particular spatial alignment, which often seems secondary or incidental in the *TRM* study. If at all given, this information is only inferred in the European languages, usuallly in cases in which a posture verb system is used.

Chapter Six

Putting it all together: The Construction Of Topological Space

This dissertation challenges the idea that topological space is objectively given or that its interpretation is unmediated by the speaker and his/her subjective and cultural knowledge of the world. In order to show that the encoding of topological spatial relations is subjective, perspectivized and contextualized, I have used a number of elicitation tools ranging from abstract line drawings to video clips on a small set of typologically different languages. I have presented some selected data sets from the different elicitations (ranging from canonical utterances across the languages and speakers to highly different intralanguage- and interlanguage specific responses) that show the different speaker-behaviors and responses to the various visual stimuli.

Typologically close languages such as German, English, and Norwegian manifest subtle differences in the expression of topological spatial relations, not to mention the larger differences evident between them and Dene or Totonac. In my view, these differences are indications of language-specific, if not construction-specific (i.e., based on the morphosyntactic affordances of a language), systems for encoding spatial relations. The languages under survey differ in terms of the semantic diversity and the subjectivity of their spatial encoding systems. Dene and Totonac seem far more descriptive than the more abstract and objective spatial encoding systems of the European languages represented here. In addition, Dene speakers tend to encode their specific perspective by means of a deictic expression. I interpret such expressions as subjective instantiations in the FIGURE/GROUND asymmetries as opposed to qualities that are characterized as being objective or externally given qualities.

In Dene and Totonac, the various expressions are dominated by the encoding of the degree of specificity and rather contextualized construal patterns. Moreover, Dene speakers reverse the FIGURE and GROUND elements in some of the examples. Against this background, I assume that a 'natural' background does not necessarily emerge to serve as an objectively given reference point. In addition, Dene speakers also frequently leave out any explicit mention of the GROUND. In other words, the FIGURE is at focus rather than its relation to a GROUND.

In Dene, spatial descriptions include information about the function of the FIGURE in relation to the GROUND, depending on its animacy, texture, material, and shape. In addition, the GROUND imposes certain interpretations, depending on whether it is solid or liquid, on the level of the ground or elevated. Hence, most FIGURE/GROUND relationships are described as contextualized situations. Contextualized indicates the influence of extra-linguistic and functional knowledge of the speaker's real world. This influence is mirrored in the various morphosyntactic affordances that go into an utterance.

Dene speakers tend to encode spatial FIGURE/GROUND aysmmetries through a cohort of morphosyntactic devices, including classificatory verbs, directional verb prefixes, and postpositions. If a locative marker is used, it only expresses generic spatial information about the FIGURE/GROUND relation. The nature and identity of the FIGURE is signaled through the classificatory verb stem plus a variety of tense/aspect, thematic, valency, and directional verb prefixes. Hence, the Dene verb system provides a variety of additional information about the FIGURE and its particular spatial alignment which is often regarded as secondary or incidental in the *TRM* and *SPACE* studies.

Spatial topological relations are not encoded on the basis of purely objective coordinates based on external and thus speaker-neutral spatial parameters. Instead, if spatial language is used in Dene, it is inclined to encode a rather perspectivized construal as opposed to a more static and objectivized one that is generally assumed for topological relations. And the same pattern, although to a lesser degree, holds also for the other languages under survey. Hence, this dissertation has shown that an amalgam of the container view and configuration view is more applicable to the various data points.

Dene speakers do indeed use highly spatial language, but the focus in many cases is on the encoding of rather perspectivized construals as opposed to static and objectivized ones only, as is prevalent in most European languages. The speakers' responses give a good indication of the considerable richness in the range of devices used to describe relations that were presumed by the MPI group to be static spatial relations between a FIGURE and GROUND object. In addition, the data support the hypothesis that, in Dene, speakers' descriptions of purportedly topological relations do not rely on locative devices exclusively. Indeed, space is often only a secondary aspect in the instantiation of the FIGURE/GROUND asymmetry and less important than temporal or more causal processes.

I have shown that the generally held assumption that topological spatial relations are usually encoded by a locative marker alone is problematic on various grounds. The data presented in this dissertation indicate that instead, single morphemes contribute to meaning only in concert with others. I have called this the cohort effect. Each morphosyntactic device in a language is part of a larger repertoire of marking devices and, thus, part of a larger semantic system. An expression is not just a morphosyntactic string, but refers to various information bits and pieces the speaker relies on, e.g., cultural knowledge, discourse and subjective experience.

The data from the different elicitation tools I have used in this dissertation have shown that, especially in languages like Dene or Totonac, there is no single spatial marker at work in locative expressions. Instead, the encoding of spatial relations is distributed via a number of elements in the utterance, some of which are only implicitly given—e.g., in form of a coercion or inference—and rely on contextual or cultural knowledge of the speaker. Moreover, the cohort devices used in a language like Dene also include bits of information that are not purely spatial, i.e., dynamism or qualities of the FIGURE or the GROUND as well as the speaker's perspective. These aspects tend to fuse into the predication. These semantic factors may not be deliberately in profile, but they are part of the expression used and thus have to be taken account of in understanding the overall locative construction.

I conclude this dissertation with an abstract schema. This is motivated by the idea that several spatial-temporal coordinates are at work in the choice of meaning components used in the encoding of topological spatial relations. These components are embedded in what I want to call the *spatial vector matrix*. This matrix presents various possible coordinates a speaker can chose from, i.e., deictic or perspective information.[65]

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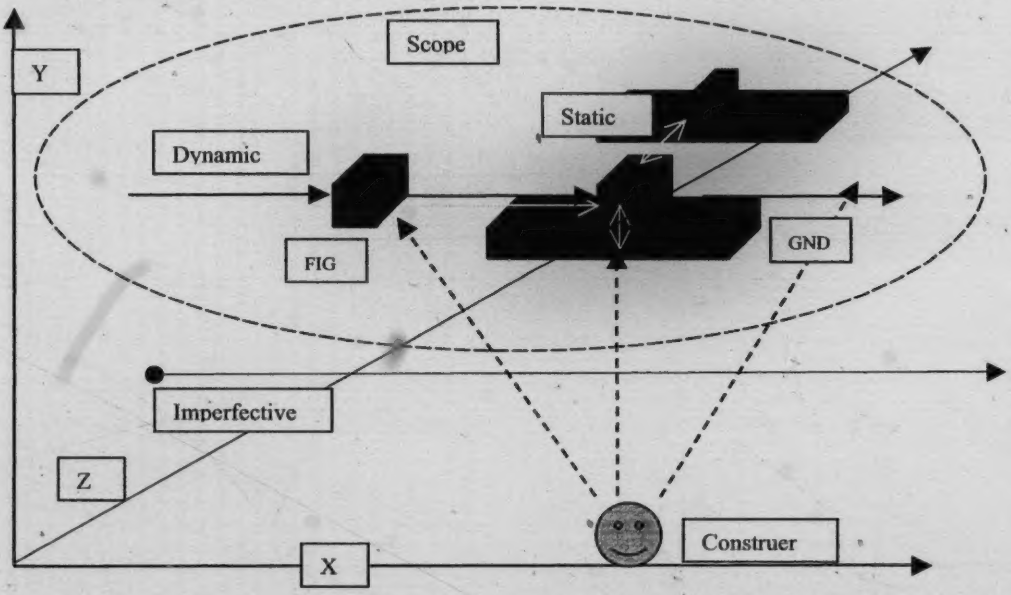
[65] Hence, for future research, it is of particular interest to record the sessions on video as well. In many cases, speakers used significant hand gestures and head movements in order to express the FIGURE's direction in form of deictic information or used gesture to indicate the manner in which the target objects were placed or moved. Deictic information refers to pragmatics and is an elaboration of the idea that a

Schema 44 presents most of the components and imaging features presented so far.[66] They are aligned in the encoding process of various FIGURE/GROUND asymmetries that are both spatial and temporal.



Schema 44: Representation of the topological spatial vector matrix: Basic components

This schema of an elaborated stage model presents the choices speakers have to encode various FIGURE/GROUND asymmetries (cf. Langacker 1987). These features depend on the viewer and her/his construction and limitations in setting the SCOPE of a perceptual scene. Marking the viewer here is crucial since most descriptions of topological relations rely on logical and objective coordinates that are independent of a viewer. In other words, those coordinates are modeled as being object-inherent features or qualities. Additionally, most canonical spatial descriptions do not depend on the viewer's language-specific affordances. However, a speaker of Dene can and does choose between FIGUREs which are comprised of different shapes, sizes, or textural features. These relations are also construed depending on the instantiated frames of reference, i.e., relative, intrinsic, or absolute frames (Levinson 2003). Hence, these instantiation processes depend on the

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sentence captures all information in a potential topological spatial relation. Indeed, deixis refers to the extra-linguistic context that is encoded in Dene especially and explicitly .

[66] However, this model does not take into account the actual shapes of FIGUREs as encoded by classificatory verb stems in Dene.

viewer's vantage point (Langacker 1987). Some scenes also profile more than one reference point, i.e., there is GROUND$_1$ and GROUND$_2$.

The number of possible spatial orientations is indicated by the yellow arrows implying topological relations. These relations depend on the construer's perspective and, by implication, the profiled scope. The X-, Y-, and Z-axes impose a limiting coordinate system on the viewer. These coordinates are not logical or objective coordinates, but limitations of a scene depending on the speaker's contextual and cultural knowledge. Speakers set vantage or focal points to relate the various objects in space. These points are determined by the speakers' instantiation of the SCOPE. The SCOPE sets the actual frame of reference that is instantiated in every single conceptual situation. In other words, the SCOPE limits the actual stage.

In Chapter 1, I have introduced the various imaging parameters that are potentially involved in the construction of topological spatial relations. Most of these parameters are reflected in Schema 44 above. Table 20 below summarizes the 7 most salient parameters. These are at work when a speaker construes a spatial scene in a stage setting.

Table 20: Imaging Features Used in Spatial Constructions

Characteristics of the FIGURE: Various Shape, Size, Material-Construction
FIGURE/GROUND Alignment
FIGURE/GROUND$_1$, GROUND$_2$
Perspective/Conceptualizer
SCOPE/SCALE/PROXIMITY
Functionality
Deictic/Vector Spatial Information

(Langacker 1987, 2000; Talmy 1983, 2000b,c)

The data I have presented in this dissertation lead to my proposed matrix above which takes into account most of the imaging parameters that are potentially available to a speaker even in the encoding of a seemingly simple construction of spatial descriptions topologically.

Dene speakers rarely signal purely topological relations between objects, or rather, the information they convey often exceeds topological relations, as necessitated by the language. The general idea is that of dynamic encoding patterns in many cases. In many cases, the usage of a locative is not necessary. In general, speakers of a language encode only such relations that can be expressed by the language's resources. Hence, the language-specific affordances guide and limit the variety of encoding patterns.

Against this background, I have proposed an approach that captures the many semantic factors that play a part in the construction of spatial descriptions, including the ones that go beyond the purely topological. In this approach, I have attempted to accommodate the different data points and especially capture Dene speakers' information without reducing its richness or varieties. My ultimate aim in this is to establish a model of topological spatial relations and its various *cohort effects*. The model developed so far captures most of the data points that have been presented in this dissertation, hence, it is far from being a universally applicable model of the constructive processes that enter into the encoding of topological spatial relations. It should thus be regarded as a first step in the direction of a more comprehensive theory of topological spatial relations that takes into account not only the various factors that play a part in the encoding of topological relations specifically. This model is thus a response to the number of rather unsatisfying models and theories in the literature that, as Vandeloise has rightly pointed out, too often idealize the intricacies in the encoding of topological spaces (Vandeloise 1991). Such models tend to say little about the relationship of the construer to the objects s/he profiles or the interplay between language-specific semantics and cognition. They do not capture the fact that language-specific affordances are highly subjective and guided by the construer's cultural knowledge of the world (Svorou 1993: 1). I believe that my approach offers a comprehensive and more naturalistic way to describe the constructive function of language in general and the interaction of various language-specific, cognitive, and cultural features in the encoding of topological space in particular.[67]

Space seems to be a given coordinate system, but as I have shown, quite a number of non-objective—e.g., subjective and cultural—qualities determine the encoding process of FIGURE/GROUND asymmetries. The general topic of ths dissertation is the constructive function of language. Language—and the linguistic sign specifically—does not mirror any objective reality, but is a mediator between human beings and the instantiated, i.e., construed world. Although embedded in the cognitive linguistic tradition, this dissertation is thus first and foremost an outline of the behavior of speakers and by that a description of language behavior.

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[67] Of course, the analysis of the latter two factors necessitates a large corpus that includes a range of different languages.

One of the results of my study is that speakers reacted quite differently to the stimuli given by the various elicitation tools. This is an interesting aspect since most analysts have defined spatial meaning, and topological relations especially, as constant and context-neutral (cf. Herskovits 1986). The fact that I received different answers from different Dene speakers to the line drawings presented in the *TRM* test indicates that there are various choices available to them. In comparison, the answers given by European speakers did vary not as much.[68] In languages like German, English or Norwegian, the range of possible descriptions thus still seems to be more limited. They tended to use either a locative marker and an existence predicate ('be + locative') or a locative marker and a posture verb cohort. Hence, almost all of the European language response patterns were descriptions of static, topological relations between a FIGURE and a GROUND, and the only variations occured with respect to the choice of an existence or posture verb in German. Other than that, a boat presented in the *TRM* was described as being on or in the water, a cloud as being above the mountain, a tree as being in front of a church.

The response patterns did not seem particularly task-specific, but rather language-specific. However, a comparison of the results of the tests developed at the MPI with the results of my own elicitation tool indicates that the former invite Dene speakers to provide more open-ended expressions in response to the images on display. This allows us to assume that the descriptive range is not necessarily solely language-dependent, but might also be a by-product of the task itself.[69] In other words, the highly abstract drawings promoted a variety of encodings in Dene and less so in the European languages. When I changed the task (or the stimuli) in *SPACE*, the Dene speakers were less varied, and the European speakers tended to add more information as opposed to the *TRM* and *CP* results, i.e., Dene and European speakers' behaviors showed fewer differences.

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[68] I received similar results when I elicited two Danish and three Swedish speakers, three speakers of Spanish—though from three different countries: Argentina, Mexico, and El Salvador—and three French (one of them French Canadian, two coming from central France).

[69] Nevertheless, I believe that the cross-linguistic variations regarding the specific concepts that are lexicalized indicate that every language has its own spatial ontology. Moreover, every speaker construes linguistically her/his world depending on the spatial ontology .

The advantage of the various elicitation tools used in this dissertation is that they do not rely on translation equivalents and, moreover, the speaker's actual language behavior is at focus. They enable the researcher to compare cross-linguistically the various encoding patterns and by that the various lexicalization processes that encode different concepts. These concepts are not only spatial, but also deictic (hence, pragmatic), temporal, and perspectivized.

However, the data presented in this dissertation also bear a number of problems with respect to the validity of comparison.

First of all, there may have occurred task effects during the various elicitation tasks. While the European speakers were asked in their respective native languages, not all of the Dene speakers were. This might have influenced the Dene speakers' responses. Moreover, the same speaker pool was used throughout the different elicitation tools, with the effect that the speakers of all languages became accustomed to the task structure in general. Being familiar with the structure of the first elicitation tool and its aim may have had an influence on the responses to the second and third one.

Another problem stems from the different backgrounds of the participants. For example, the Dene and Totonac speakers are not at all affiliated with academia as opposed to nearly all of the European speakers which may have had an impact on the result of the elicitations. I have not taken into account any socio-econonomic or educational differences between speakers, nor have I addressed the role literacy in a language might play. Dene lacks a written tradition and, in any case, the speakers were not familiar with the rather artificial stimulus and response patterns of these elicitation sessions. If this has an impact on the results of the elicitation tests or not has not been the focus of my analysis. I have not differentiated between sex or age of the participants either. These factors may also have an impact on the range of encoding patterns. I have already pointed out that this is the case in Dene. In Chapter 3, I have stated that I only included the response patterns of the elder speakers since the younger speakers do not produce full grammatical paradigms. This of course can be explained by the fact that Dene is an endangered language that the younger speakers do not speak on a daily basis any more. Still it might be of interest to investigate whether there are differences in other languages depending on sex or age of the speakers.

For future research it should be noted that the different responses should not only be compared cross-linguistically. It also should include an analysis of intra-language and intra-speaker specificities. The researcher should cross-check the response patterns of one language first before comparing them with the results of other languages. This would help to differentiate between language-specific, speaker-specific, and task-specific responses. These differentiations may serve to present a more realistic picture of the actual enoding patterns and the various imaging features used. However, although my disseration has not taken into account the differences regarding the speakers' socio-economic, educational, age and gender related histories, in my opinion the cross-linguistic differences in the data still support my hypothesis of subjective encoding patterns and language-mediated differences in degrees of specificity.

It can be claimed that the task results reveal insights into the various morphosyntactic affordances of a language and its differences to other languages rather than into spatial cognition. However, I argue that the tasks do allow one to compare the relations between visual perception and language. Among other things, the focus of this dissertation has been on the imaging features that go into spatial descriptions. The small pool of languages under survey here has allowed me to show that subtle differences in the encoding process are due to language-specific and cultural-specific affordances. Moreover, the tests revealed that various qualities of the FIGURE/GROUND asymmetries are encoded as well as differences in setting the actual scope of a situation.

To investigate the relationship between language and spatial cognition, future research could take the actual responses from speakers as a point of departure. For example, a speaker could be asked to read a sentence like 'the tree is in front of the church', while another one could use actual objects (e.g., miniature models of a tree and a chuch, a hatchet and a stump) and relate them to each other according to the prompt. It might be interesting to 'turn around' the methodology in this dissertation in order to find out how speakers relate actual objects according to language-specific descriptions.

Finally, on an epistemological note, Wittgenstein warned against an idealization of language as if it exists as a decomposable object. In fact, language use is a slippery beast that does not rely on idealized and objective external parameters only, but also on subjective and cultural experiences of the speakers. As I have outlined in the beginning of this dissertation, it is therefore difficult to define and limit what is called space. Contextualizing the respective FIGURE/GROUND asymmetries under survey gives a more truthful account on what is going on in a language, a language community, a speaker's mind and between speakers.

I conclude this dissertation with the quote by Vandeloise that I have already cited in Chapter 2. It captures all the different problems in the description of topological spatial relations and simultaneously hints at a possible solution in the description of topological relations:

> [S]patial terms have been described in relation to our knowledge of the world. We have here a kinetic and dynamic understanding, not simply a static knowledge. For reasons of descriptive ease, a static explanation of language is often given, just as it may be convenient for the film critic to stop the film for a moment to examine one image in greater detail. If he forgets to set it in motion again, however, he will lose an essential element of the cinema: the constant movement of images on the screen. I believe that the changes in situations motivating language have all too often been frozen for descriptive ease. (Vandeloise 1991: 237)

This dissertation has begun to thaw the static image of the film and set it in motion again.

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